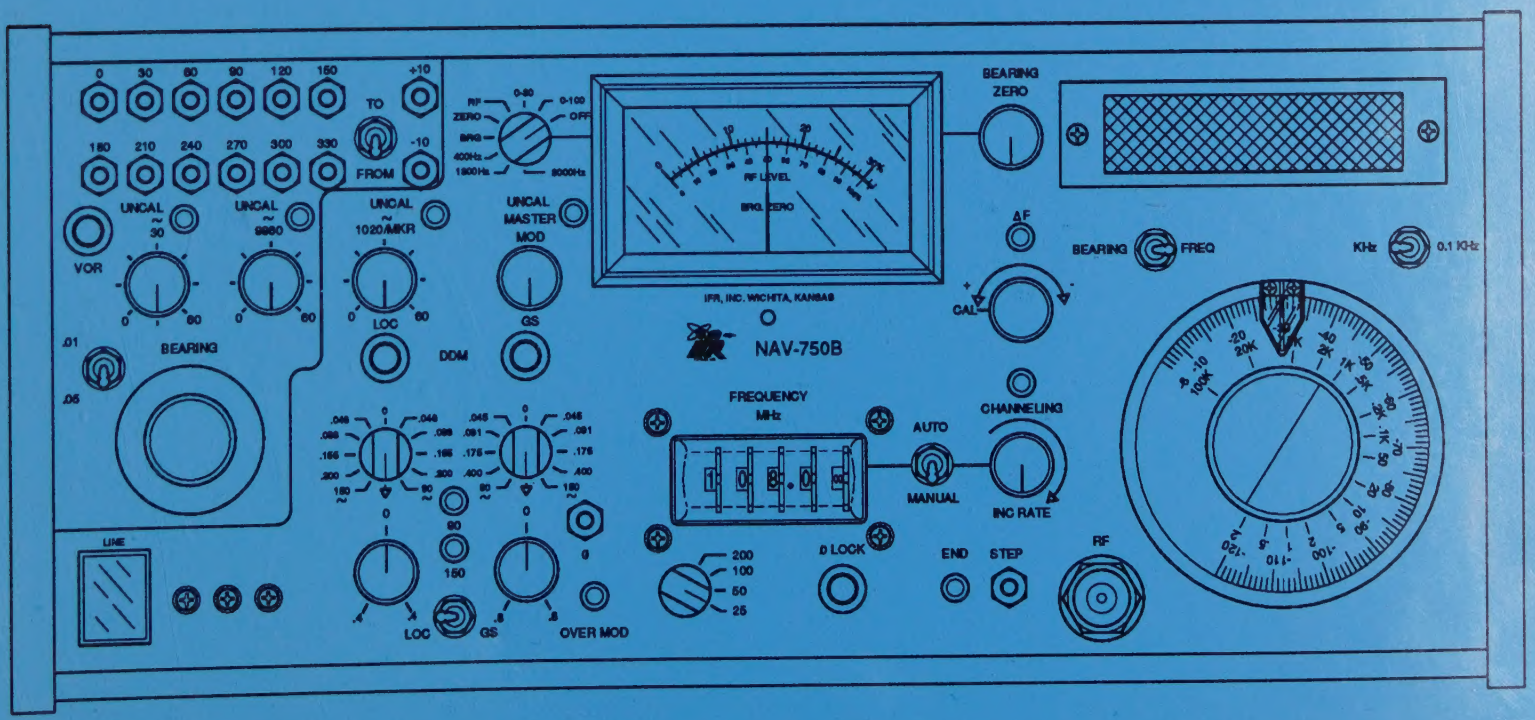
OPERATION MANUAL

NAV - 750B

VOR/LOC/COMM/G/S/MKR BENCH TEST SET



SYSTEMS, INC.

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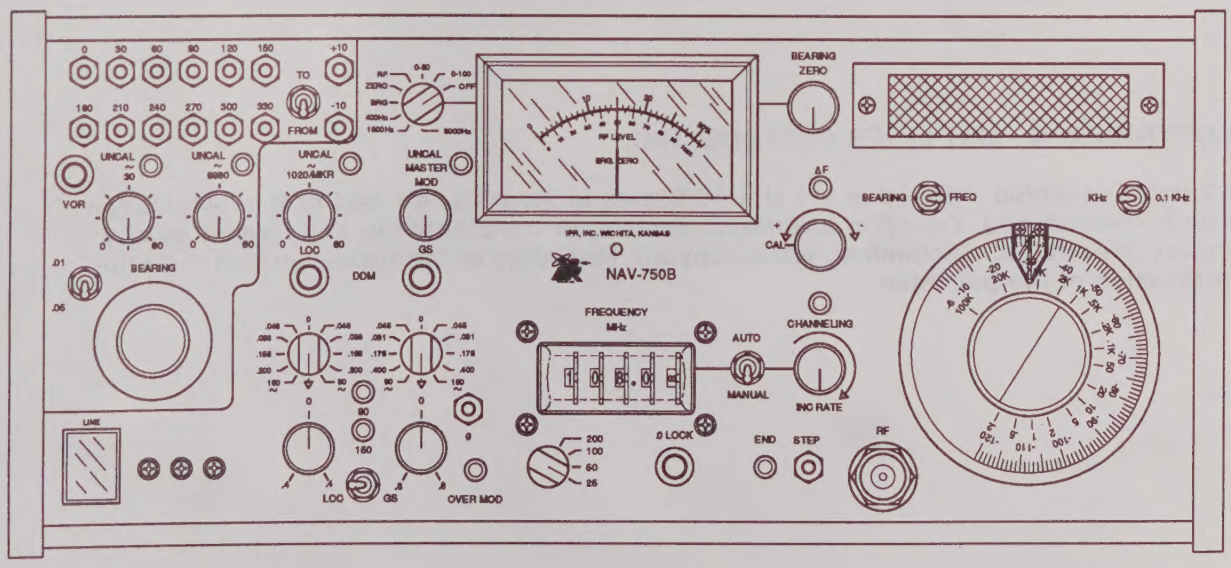

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1002-1602-500

OPERATION MANUAL
NAV-750B

PUBLISHED BY
IFR SYSTEMS, INC.
Wichita, Kansas

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WARNING

HIGH VOLTAGE EQUIPMENT

THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.

RESCUE OF SHOCK VICTIMS

1. DO NOT ATTEMPT TO PULL OR GRAB THE VICTIM.
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.
3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PUSH, PULL OR LIFT THE VICTIM TO SAFETY USING A WOODEN POLE, ROPE OR SOME OTHER DRY INSULATING MATERIAL.

FIRST AID

1. AS SOON AS VICTIM IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE VICTIM A SHORT DISTANCE AWAY FROM SHOCK HAZARD.
2. CALL FOR DOCTOR AND/OR AMBULANCE, IMMEDIATELY.
3. IF BREATHING HAS STOPPED; ADMINISTER CARDIO-PULMONARY RESUSCITATION (CPR), AS NEEDED.
4. IF VICTIM IS BREATHING, ATTEMPT TO CONTROL ALL SERIOUS BLEEDING.
5. KEEP VICTIM WARM, QUIET AND FLAT ON HIS/HER BACK.

CAUTION: INTEGRATED CIRCUITS AND SOLID STATE DEVICES SUCH AS MOS FETS, ESPECIALLY CMOS TYPES, ARE SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGES RECEIVED FROM IMPROPER HANDLING, THE USE OF UNGROUNDED TOOLS, AND IMPROPER STORAGE AND PACKAGING. ANY MAINTENANCE TO THIS UNIT MUST BE PERFORMED WITH THE FOLLOWING PRECAUTIONS:

- BEFORE USE IN A CIRCUIT, KEEP ALL LEADS SHORTED TOGETHER EITHER BY THE USE OF VENDOR-SUPPLIED SHORTING SPRINGS OR BY INSERTING LEADS INTO A CONDUCTIVE MATERIAL.
- WHEN REMOVING DEVICES FROM THEIR CONTAINERS, GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.
- TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.
- DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.
- PC BOARDS, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAG. REMOVE ANY BUILT-IN POWER SOURCE, SUCH AS A BATTERY, BEFORE LAYING PC BOARDS ON A CONDUCTIVE MAT OR STORING IN A CONDUCTIVE CONTAINER.
- PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGED IN A CONDUCTIVE BAG AND PLACED IN A WELL-CUSHIONED SHIPPING BAG.

CAUTION: THE USE OF SIGNAL GENERATORS FOR MAINTENANCE AND OTHER ACTIVITIES CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE TO AVIATION RECEIVERS, WHICH CAN CAUSE DISRUPTION AND INTERFERENCE TO AERONAUTICAL SERVICE OUT TO A DISTANCE OF SEVERAL MILES.

CAUTION: USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION WHICH RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND ENSURE COMPLIANCE WITH INSTRUCTIONS IN FAA CIRCULAR AC 170-6C, DATED FEBRUARY 19, 1981.

RECORD OF REVISIONS

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INTRODUCTION - NAV-750B BENCH TEST SET

This manual contains the information necessary to install, operate and evaluate the NAV-750B Bench Test Set.

It is strongly recommended that personnel be throughly familiar with the contents of this manual before attempting to operate this equipment.

ORGANIZATION

This manual is divided into five sections as follows:

CHAPTER 1 - OPERATION

Section 1 - DESCRIPTION (physical and mechanical description of NAV-750B)

Section 2 - OPERATION (installation; description of controls, connectors and indicators; performance evaluation; general operating procedures)

Section 3 - SPECIFICATIONS

Section 4 - SHIPPING

Section 5 - STORAGE

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CHAPTER ONE

NAV-750B BENCH TEST SET

OPERATION MANUAL

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SECTION 1 - DESCRIPTION

1. General Description and Capabilities

A. General

The NAV-750B is a precision simulator of VOR, ILS (LOC and G/S), COMM and Marker Beacon (MKR) ground stations. The NAV-750B is self-contained and requires no additional equipment for NAV, ILS, COMM and MKR receiver testing.

B. Functional Capabilities

(1) VOR

The VOR section provides pushbutton bearing selection for each 30° of Azimuth, as well as two pushbuttons to increase or decrease the generated bearing in 10° increments. The bearing is varied in 0.01° or 0.05° increments with the bearing control. All VOR RF output levels can be varied with a calibrated output attenuator.

(2) LOC and G/S

The LOC and G/S sections use precision 90 and 150 Hz tone generators to provide accurately mixed tones for "on-course" and specific "off-course" signals. All LOC and G/S RF output levels can be varied with a calibrated output attenuator.

(3) COMM

The COMM receiver frequencies (118.000 to 156.000 MHz) are generated by an RF generator in 25 kHz steps. A 1020 Hz tone may be added. All COMM receiver RF output levels can be varied with a calibrated output attenuator.

(4) RF Generator

In all modes of operation, the RF generator is crystal controlled and phase-locked in 25 kHz steps. Automatic frequency stepping is provided in 25, 50, 100 or 200 kHz increments. A Variable Frequency control provides ±30 kHz on MKR, ±50 kHz on VOR, ±50 kHz on LOC, ±50 kHz on COMM and ±150 kHz on G/S frequencies.

(5) MKR

Simulates Inner, Middle and Outer MKR receivers. MKR RF output ranges from 70.000 to 79.000 MHz. The MKR RF output level is variable with a calibrated output attenuator.

C. Mechanical Description

The NAV-750B mechanical description is shown in 1-1-1, Figure 1.

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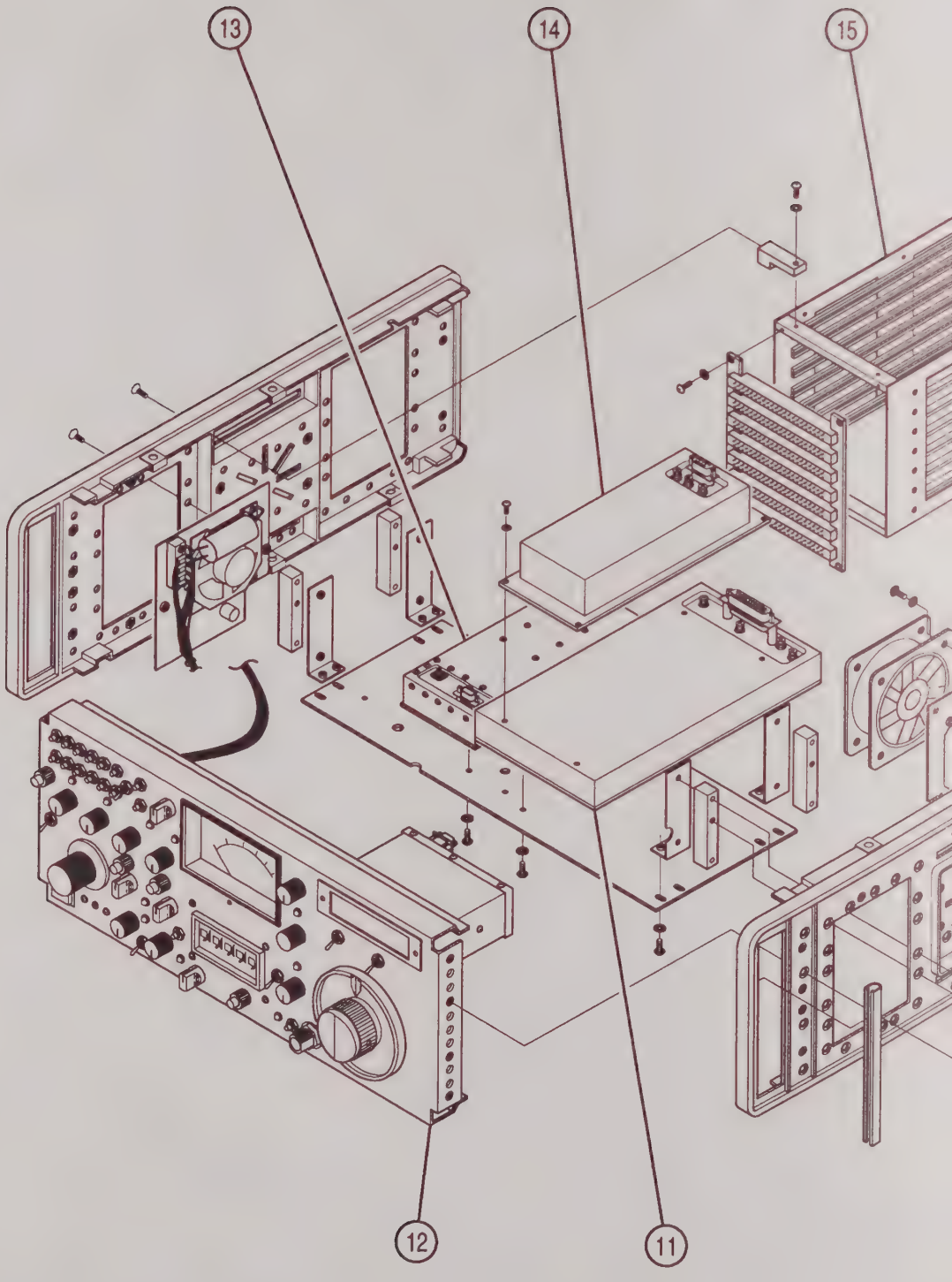
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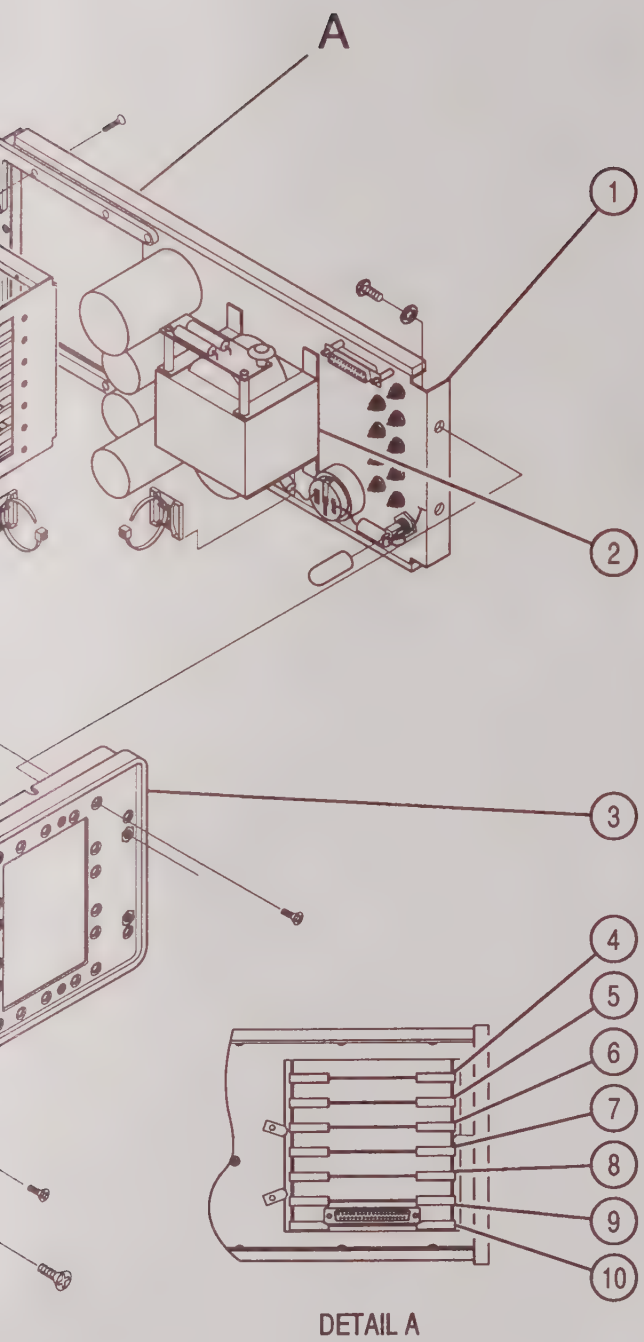

DETAIL A

1. REAR PANEL ASSEMBLY
2. POWER SUPPLY ASSEMBLY
3. SIDE PANEL
4. BEARING CHECK AND CORRECTOR PC BOARD
5. 30 Hz SINE PC BOARD
6. TONE SUMMATION PC BOARD
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10. REMOTE CHANNELING PC BOARD
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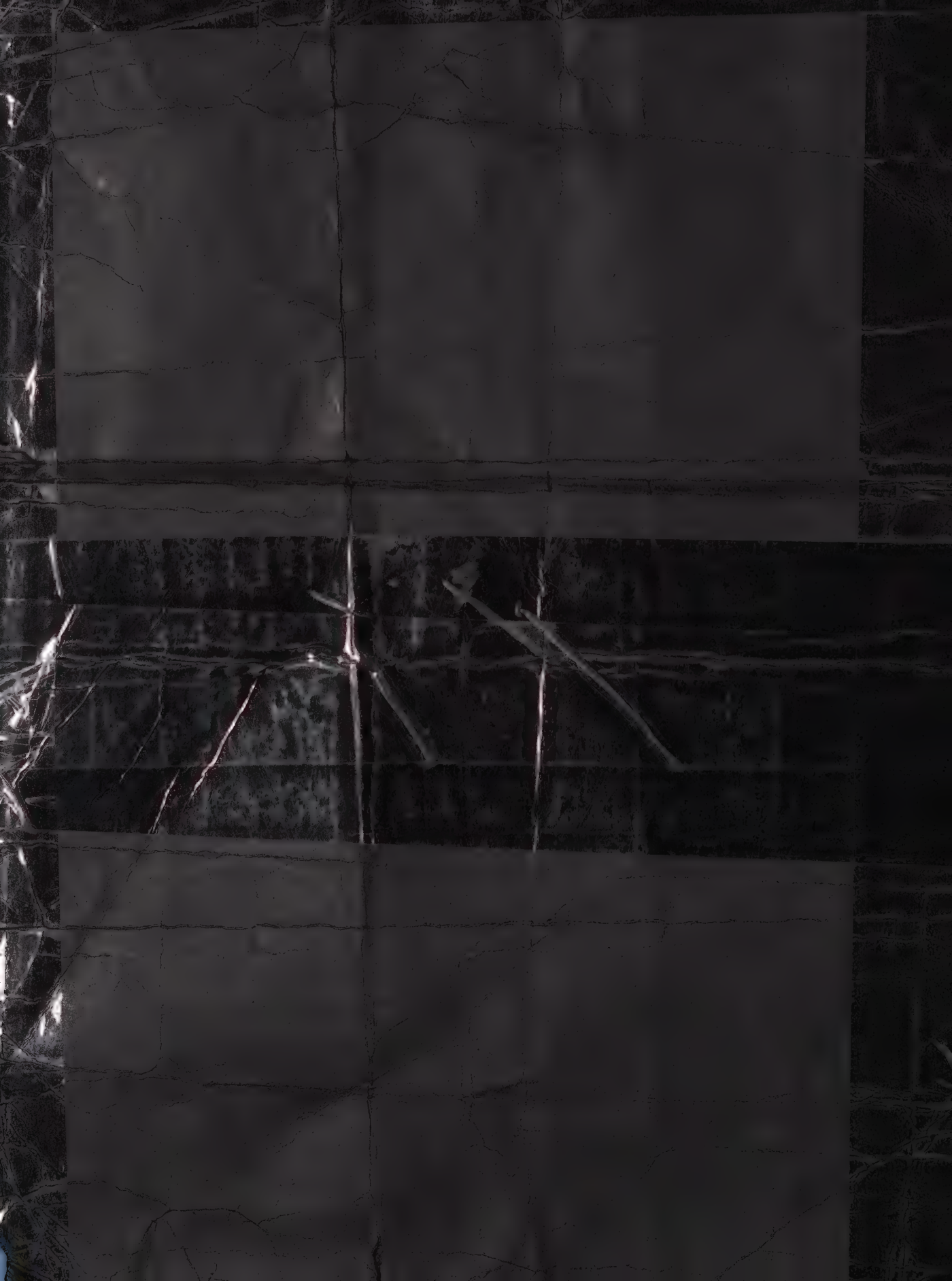
12. FRONT PANEL ASSEMBLY
13. MODULATOR/AMPLIFIER ASSEMBLY
14. NAV-750B OSCILLATOR ASSEMBLY
15. CARD CAGE

NAV-750B Composite Assembly
Figure 1



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SECTION 2 - OPERATION

1. Installation

A. General

STEP PROCEDURE

1. Set NAV-750B into operating position.

2. Connect ac power cable from AC INPUT Connector (50) (1-2-2, Figure 2) to a 105 to 120 VAC or 220 to 250 VAC, 50 to 400 Hz source.

B. Safety Precautions

Listed are several important safety precautions which must be observed during installation and operation. IFR Systems, Inc. assumes no liability for failure to comply with any safety precautions outlined in this manual.

(1) Complying with Instructions

Installation/operating personnel should not attempt to install or operate the NAV-750B without reading and complying with all instructions contained in this manual. All procedures must be performed in exact sequence and manner described.

(2) Grounding Requirements

To minimize shock hazard, all equipment chassis and cabinets must be connected to electrical ground. All IFR Systems, Inc. test sets are equipped with a standard three-prong power cable which must be connected to a properly grounded three-prong wall receptacle. It is the customer's responsibility to:

- Have a qualified electrician check wall receptacle(s) for proper grounding.
- Replace any standard two-prong wall receptacle(s) with properly grounded three-prong receptacle(s).

WARNING: DUE TO POTENTIAL SAFETY HAZARDS, USE OF THREE-PRONG TO TWO-PRONG ADAPTOR PLUG IS NOT RECOMMENDED.

(3) Operating Safety

Due to presence of potentially lethal voltages within NAV-750B, operating personnel must not remove top or bottom covers at any time.

(4) CAUTION and WARNING Labels

Extreme care should be exercised when performing any operations preceded by a CAUTION or WARNING label. CAUTION labels appear where possibility of damage to equipment exists and WARNING labels denote conditions where bodily injury or death may result.

C. Rack-Mount Installation

The NAV-750B is installed in bench-top or rack-mount fashion. All IFR Systems, Inc. test sets are shipped from factory with plastic feet installed for bench-top installation. Conversion from bench-top to rack-mount installation is possible by ordering the Rack-Mount Kit (7001-7636-800). One kit per unit is required for installation.

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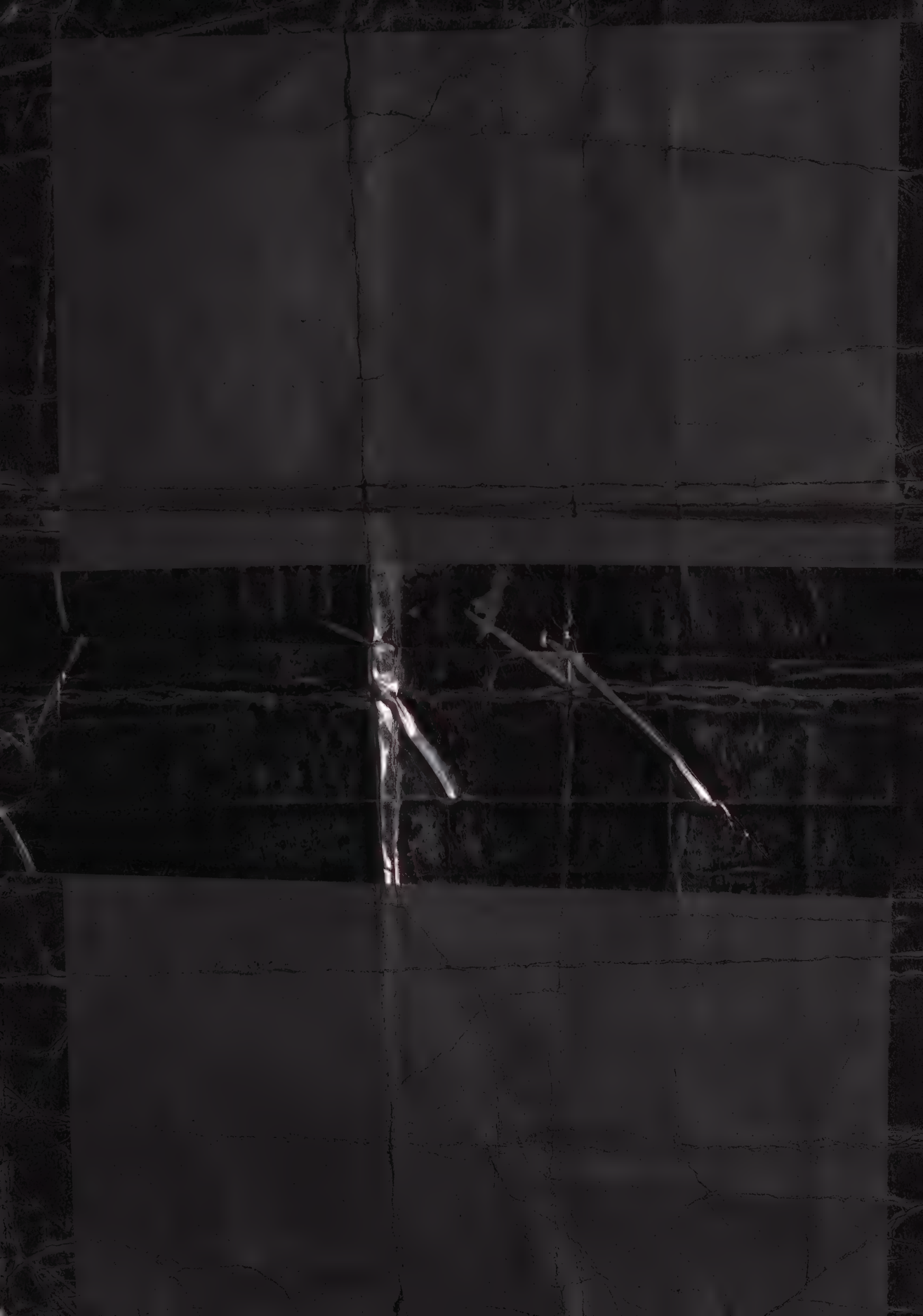
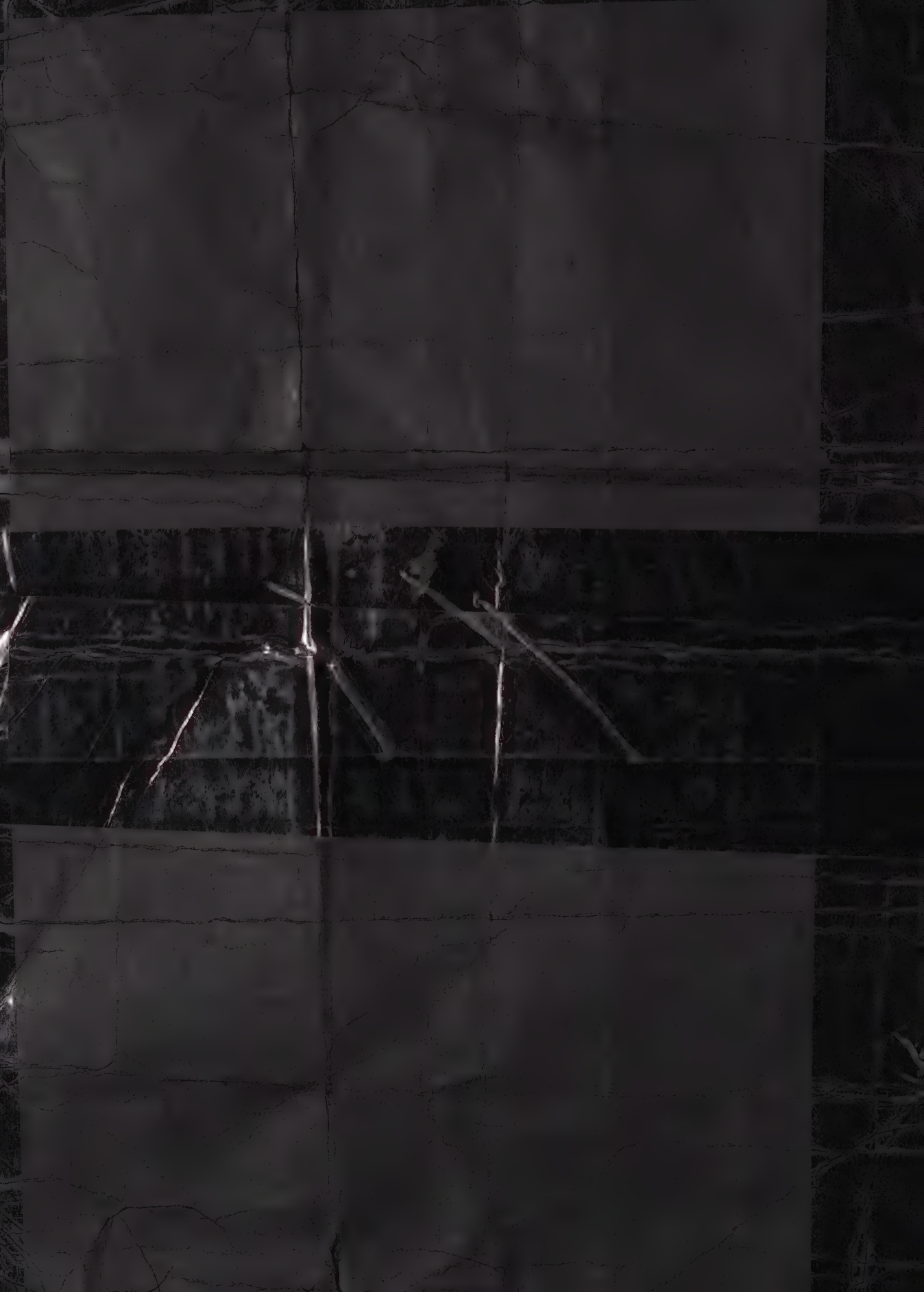
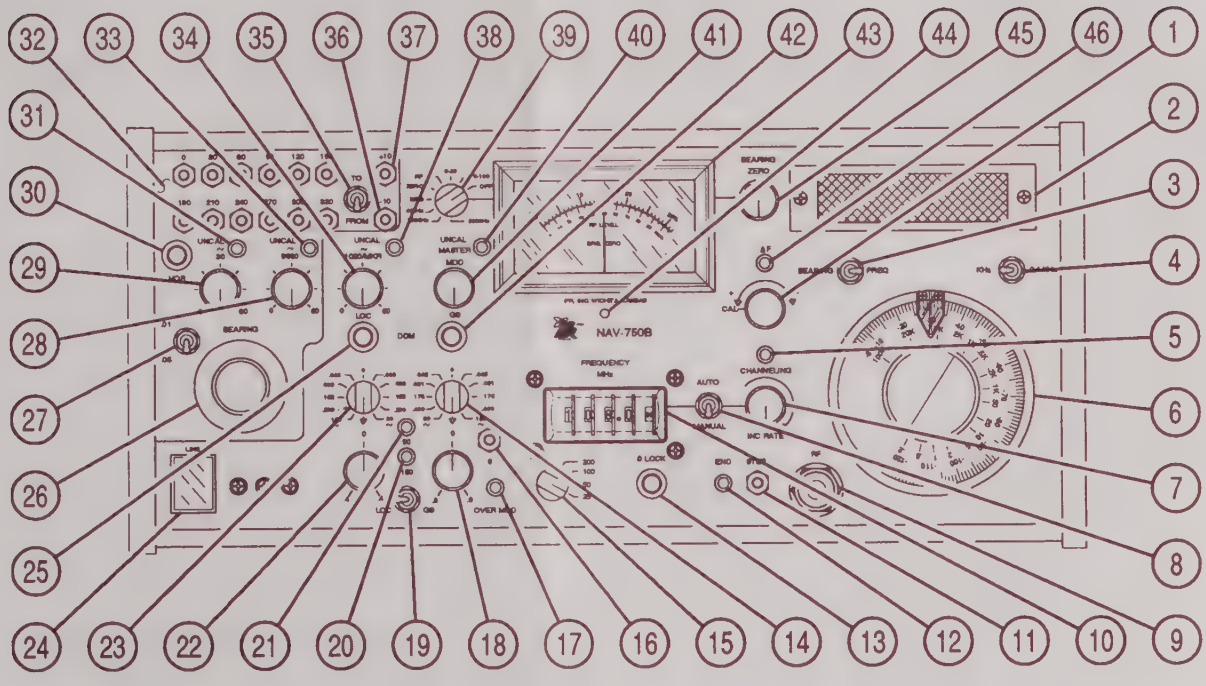
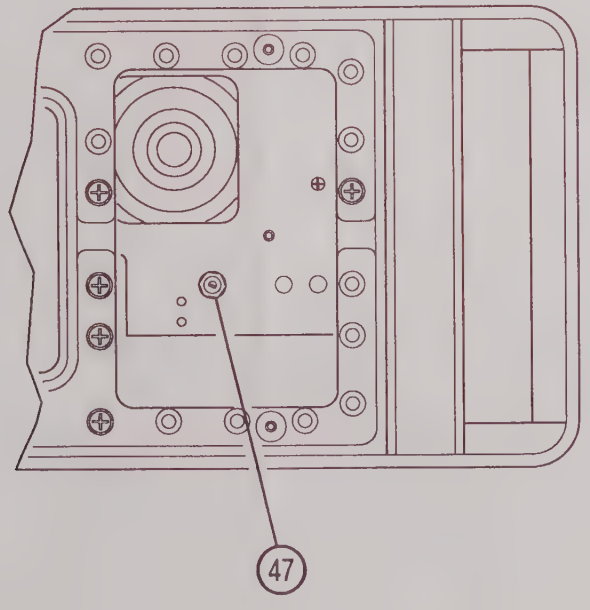




2. Description of Controls, Connectors and Indicators





1. ΔF Control
2. BEARING-FREQUENCY Display
3. BEARING-FREQUENCY DISPLAY Switch
4. FREQUENCY RESOLUTION Switch
5. CHANNELING Indicator
6. RF OUTPUT ATTENUATOR
7. CHANNELING RATE Control
8. AUTO-MANUAL FREQUENCY CONTROL Switch
9. RF OUTPUT Connector (J3)
10. FREQUENCY SELECTOR Switches
11. MANUAL FREQUENCY Step Switch
12. END CHANNELING Indicator
13. PHASE LOCK Indicator
14. G/S DDM SELECTOR Switch
15. CHANNELING FREQUENCY INCREMENT Switch
16. 90 Hz-150 Hz PHASE DEVIATION Switch
17. OVERMODULATION Indicator
18. G/S VARIABLE DDM Control
19. LOC-G/S FREQUENCY SELECT Switch
20. 150 Hz TONE OFF Indicator
21. 90 Hz TONE OFF Indicator
22. LOC VARIABLE DDM Control
23. LOC DDM SELECTOR Switch
24. AC POWER LINE Switch
25. LOC MODE Indicator
26. VARIABLE BEARING Control
27. VARIABLE BEARING SELECT Switch
28. 9960 Hz TONE MODULATION LEVEL Control
29. 30 Hz TONE MODULATION LEVEL Control
30. VOR MODE Indicator
31. 30 Hz UNCAL Indicator
32. VOR BEARING SELECT Pushbutton Switches
33. 9960 Hz UNCAL Indicator
34. 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control
35. TO-FROM BEARING Switch
36. -10° BEARING Pushbutton Switch
37. +10° BEARING Pushbutton Switch
38. 1020 Hz UNCAL Indicator
39. METER FUNCTION AND TONE SELECTOR Switch
40. MASTER MODULATION UNCAL Indicator
41. MASTER MODULATION LEVEL Control
42. G/S MODE Indicator
43. METER
44. METER Adjustment Screw
45. BEARING ZERO ADJUST Control
46. ΔF Indicator
47. AUDIO LEVEL Control

NAV-750B Front and Side Panels
Figure 1

A. Front Panel (2-2-2, Figure 1)

ITEM	DESCRIPTION

1. ΔF Control

   When rotated cw, RF output is displayed, as follows, on BEARING-FREQUENCY Display (2):

   ±30 kHz in 70.000 to 79.000 MHz range
   ±50 kHz in 108.000 to 157.000 MHz range
   ±150 kHz in 329.000 to 335.000 MHz range

   NOTE: When ΔF Control is in detent (fully ccw) position, there is no effect on RF output.

2. BEARING-FREQUENCY Display

   Indicates VOR bearing or generator output frequency.

3. BEARING-FREQUENCY DISPLAY Switch

   Selects output frequency or VOR bearing information for display on BEARING-FREQUENCY Display (2).

4. FREQUENCY RESOLUTION Switch

   Selects display readout to indicate output frequency to nearest 1 or 100 kHz.

5. CHANNELING Indicator

   Illuminates when AUTO-MANUAL FREQUENCY CONTROL Switch (8) is set to AUTO.

6. RF OUTPUT ATTENUATOR

   Sets RF output level between -120 and -6 dBm.

7. CHANNELING RATE Control

   Sets desired channeling rate when AUTO-MANUAL FREQUENCY CONTROL Switch (8) is set to AUTO. Maximum channeling rate is fully cw and fully ccw stops automatic channeling.

8. AUTO-MANUAL FREQUENCY CONTROL Switch

   Selects AUTO or MANUAL channeling.

9. RF OUTPUT Connector (J3)

   Provides RF (50 Ω impedance) to UUT.

ITEM DESCRIPTION

10. FREQUENCY SELECTOR Switches

Sets output frequency of RF generator when AUTO-MANUAL FREQUENCY CONTROL Switch (8) is set to MANUAL. When AUTO channeling is used, FREQUENCY SELECTOR Switches set starting frequency.

11. MANUAL FREQUENCY Step Switch

Advances RF output one increment each time MANUAL FREQUENCY Step Switch is pressed. AUTO-MANUAL FREQUENCY CONTROL Switch (8) must be set to AUTO and CHANNELING RATE Control (7) set fully ccw.

12. END CHANNELING Indicator

Illuminates when channeling reaches 117.950, 135.975 or 157.950 MHz. Auto channeling stops at these frequencies.

13. PHASE LOCK Indicator

ON Confirms RF generator is controlled by phase-lock system.

OFF Generator is out of frequency control.

14. G/S DDM SELECTOR Switch

Provides precise G/S deviations in 0.045, 0.091, 0.175 and 0.400 DDM increments. Right rotation attenuates 90 Hz tone to simulate "Aircraft Low" on G/S condition and cause UUT G/S pointer movement to be UP. When positioned to 90 Hz or 150 Hz detents, only the selected tone is present and the other is OFF. In downward position, G/S VARIABLE DDM Control (18) is activated and G/S DDM is continuously controlled from -0.8 to +0.8 DDM.

15. CHANNELING FREQUENCY INCREMENT Switch

Provides four channel spacing choices (25, 50, 100 or 200 kHz) for automatic channeling. Automatic channeling increases output frequency in selected frequency increment.

16. 90 Hz-150 Hz PHASE DEVIATION Switch

Sets phase relationship between 90 Hz and 150 Hz LOC and G/S tones.

NOTE: Normally fixed to within ±0.1°.

NOTE: The term "phase relationship" refers to relative phase position of 90 and 150 Hz tone signals every 1/30 second from a given time. Phase difference between two tones is constantly changing, but relative phase positions, for a given set of circuit constants, match every 1/30 second.

Phase relationship is varied by retarding 150 Hz tone relative to 90 Hz tone 5° for each degree of selected VOR bearing when 90 Hz-150 Hz PHASE DEVIATION Switch is pressed.

ITEM DESCRIPTION

EXAMPLE: Selecting 30° VOR bearing and pressing the 90 Hz-150 Hz PHASE DEVIATION Switch shifts phase relationship between two tones 50°. When VOR bearing is 12° and 90 Hz-150 Hz PHASE DEVIATION Switch is pressed, there is a 60° phase shift and amplitude summation of 90 Hz and 150 Hz tones is greatest.

17. OVERMODULATION Indicator

Illuminates when RF carrier modulation level reaches 100%.

18. G/S VARIABLE DDM Control

Controls G/S DDM deviation when G/S DDM SELECTOR Switch (14) is pointing down. Turning left and right of center obtains G/S deviation of ±0.8 DDM.

19. LOC-G/S FREQUENCY SELECT Switch

Provides immediate selection of G/S frequency paired to selected or displayed LOC frequency. In LOC position, when a LOC frequency has been selected or channeled, LOC mode and modulation will be selected. In G/S position, G/S mode and modulation will be selected if a LOC-G/S paired frequency is channeled.

20. 150 Hz TONE OFF Indicator

Illuminates when 150 Hz tone is OFF.

21. 90 Hz TONE OFF Indicator

Illuminates when 90 Hz tone is OFF.

22. LOC VARIABLE DDM Control

Controls LOC DDM deviation when LOC DDM SELECTOR Switch (23) is pointing down. Turning left and right of center obtains LOC deviation of ±0.4 DDM.

23. LOC DDM SELECTOR Switch

Provides precise LOC deviations in 0.046, 0.093, 0.155, and 0.200 DDM increments. Right rotation attenuates 150 Hz tone which simulates "Aircraft Left" on LOC condition and causes UUT LOC pointer movement to right. When positioned to 90 Hz or 150 Hz detents, only selected tone is present and other is OFF. In downward position, LOC VARIABLE DDM Control (22) is activated and LOC DDM is continuously controlled from -0.4 to +0.4 DDM.

24. AC POWER LINE Switch

Applies power to NAV-750B. Illuminates when power is ON.

25. LOC MODE Indicator

Illuminates when NAV-750B is in LOC mode of operation.

26. VARIABLE BEARING Control

Increases VOR bearing when rotated cw and decreases VOR bearing when rotated ccw. Bearing incremental change depends upon position generated by VARIABLE BEARING SELECT Switch (27).

27. VARIABLE BEARING SELECT Switch

Selects 0.01° or 0.05° incremental bearing changes generated by VARIABLE BEARING CONTROL (26).

28. 9960 Hz TONE MODULATION LEVEL Control

When set to UNCAL fully ccw (0), 9960 Hz tone modulation level in VOR mode is set to 30%. When rotating cw, modulation level is varied from 0% to 60%.

29. 30 Hz TONE MODULATION LEVEL Control

When set to UNCAL fully ccw (0), 30 Hz tone modulation level in VOR mode is set to 30%. When rotating cw, modulation level is varied from 0% to 60%.

30. VOR MODE Indicator

Illuminates when NAV-750B is in VOR mode of operation.

31. 30 Hz UNCAL Indicator

Illuminates when 30 Hz TONE MODULATION LEVEL Control (29) is not in calibrated detent position.

32. VOR BEARING SELECT Pushbutton Switches

BUTTON	RESULT
0	Sets VOR bearing to 0 Hz.
30	Sets VOR bearing to 30 Hz.
60	Sets VOR bearing to 60 Hz.
90	Sets VOR bearing to 90 Hz.
120	Sets VOR bearing to 120 Hz.
150	Sets VOR bearing to 150 Hz.
180	Sets VOR bearing to 180 Hz.
210	Sets VOR bearing to 210 Hz.
240	Sets VOR bearing to 240 Hz.
270	Sets VOR bearing to 270 Hz.
300	Sets VOR bearing to 300 Hz.
330	Sets VOR bearing to 330 Hz.

ITEM DESCRIPTION

33. 9960 Hz UNCAL Indicator

Illuminates when 9960 Hz TONE MODULATION LEVEL Control (28) is not in calibrated detent position.

34. 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control

When rotated ccw to calibrated detent position, 1020 Hz tone is OFF in LOC mode, OFF in VOR mode and ON at 30% modulation level in COMM mode. On COMM, tone is deleted by setting control to zero, and then varied for 0% to 60% modulation level. On VOR, tone is added with cw rotation for modulation levels from 0% to 60%. When MKR tone is selected while in MKR mode, tone modulation level is automatically set to 95% with the tone modulation level control in calibrated detent position. Out of calibrated detent position, 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control varies modulation level from 0% to 98%.

35. TO-FROM BEARING Switch

Sets phase relationship between 30 Hz REF and 30 Hz VAR tones to set selected bearing to a TO or FROM bearing.

36. -10° BEARING Pushbutton Switch

Subtracts exactly 10° from VOR bearing when pressed.

37. +10° BEARING Pushbutton Switch

Adds exactly 10° to VOR bearing when pressed.

38. 1020 Hz UNCAL Indicator

Illuminates when 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control (34) is not in calibrated detent position.

39. METER FUNCTION AND TONE SELECTOR Switch

Selects METER (43) range and functions. In BRG and ZERO switch positions, METER (43) indicates accuracy of VOR output. In RF position, METER (43) indicates RF level of attenuator. 0-30% and 0-100% positions are for monitoring or setting signal modulation levels.

NOTE: At last cw position of selector switch, METER (43) is inoperative with terminals shorted. This position protects METER (43) from damage when NAV-750B is moved.

Selects output frequency (400 Hz, 1300 Hz or 3000 Hz) of internal tone generator.

NOTE: When MKR tone is selected, METER (43) is automatically set to 0-100% modulation range.

ITEM DESCRIPTION

40. MASTER MODULATION UNCAL Indicator

Illuminates when MASTER MODULATION LEVEL Control (41) is not in calibrated detent position.

41. MASTER MODULATION LEVEL Control

When rotated cw and all other tone level controls are in calibrated detent position, tone modulation levels varies from 0% to approximately twice the calibrated values or 100%, whichever is greater.

42. G/S MODE Indicator

Illuminates when NAV-750B is in G/S mode of operation.

43. METER

Indications, related to METER FUNCTION AND TONE SELECTOR Switch (39) positions, are as follows:

- BRG

  Bearing deviation in 0.1° increments. Number 50 on lower scale represents zero deviation. Each number to left of 50 is -0.1° and each number to right of 50 is +0.1°.

  EXAMPLE: Indication at 20 is -0.3° deviation and indication at 90 is +0.4° bearing deviation.

- ZERO

  Bearing check circuitry is set to zero using the BEARING ZERO ADJUST Control (45).

- RF

  Monitors RF level at the input of RF OUTPUT ATTENUATOR (6).

- 0-30

  Top scale is used for modulation values ≤30%.

- 0-100

  Lower scale is used for modulation values ≤100%.

44. METER Adjustment Screw

Mechanical zero adjustment for METER (43) when power is OFF.

ITEM	DESCRIPTION

45. BEARING ZERO ADJUST Control

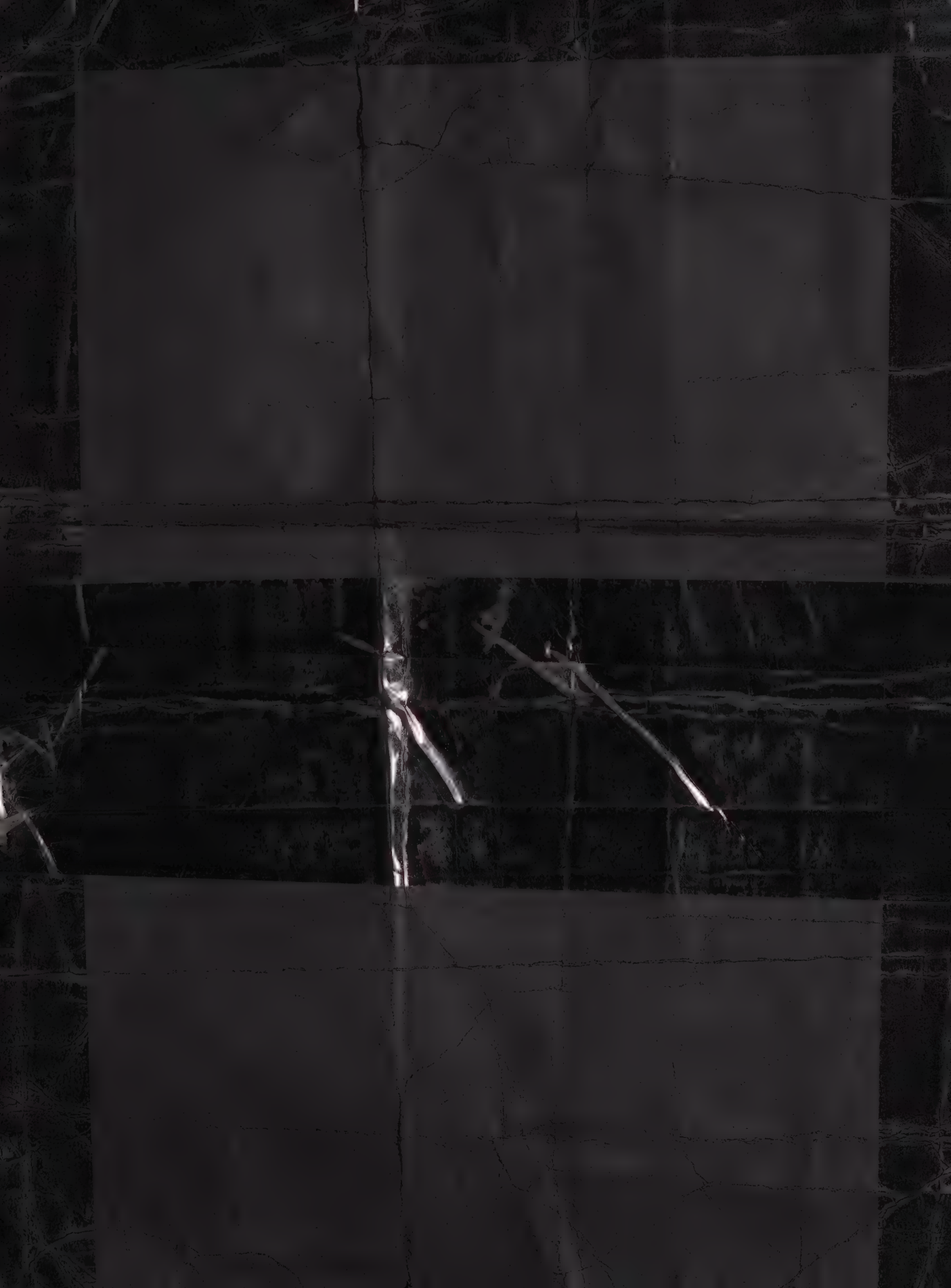
    Sets bearing check circuitry to zero, as indicated by a center scale indication on METER (43).

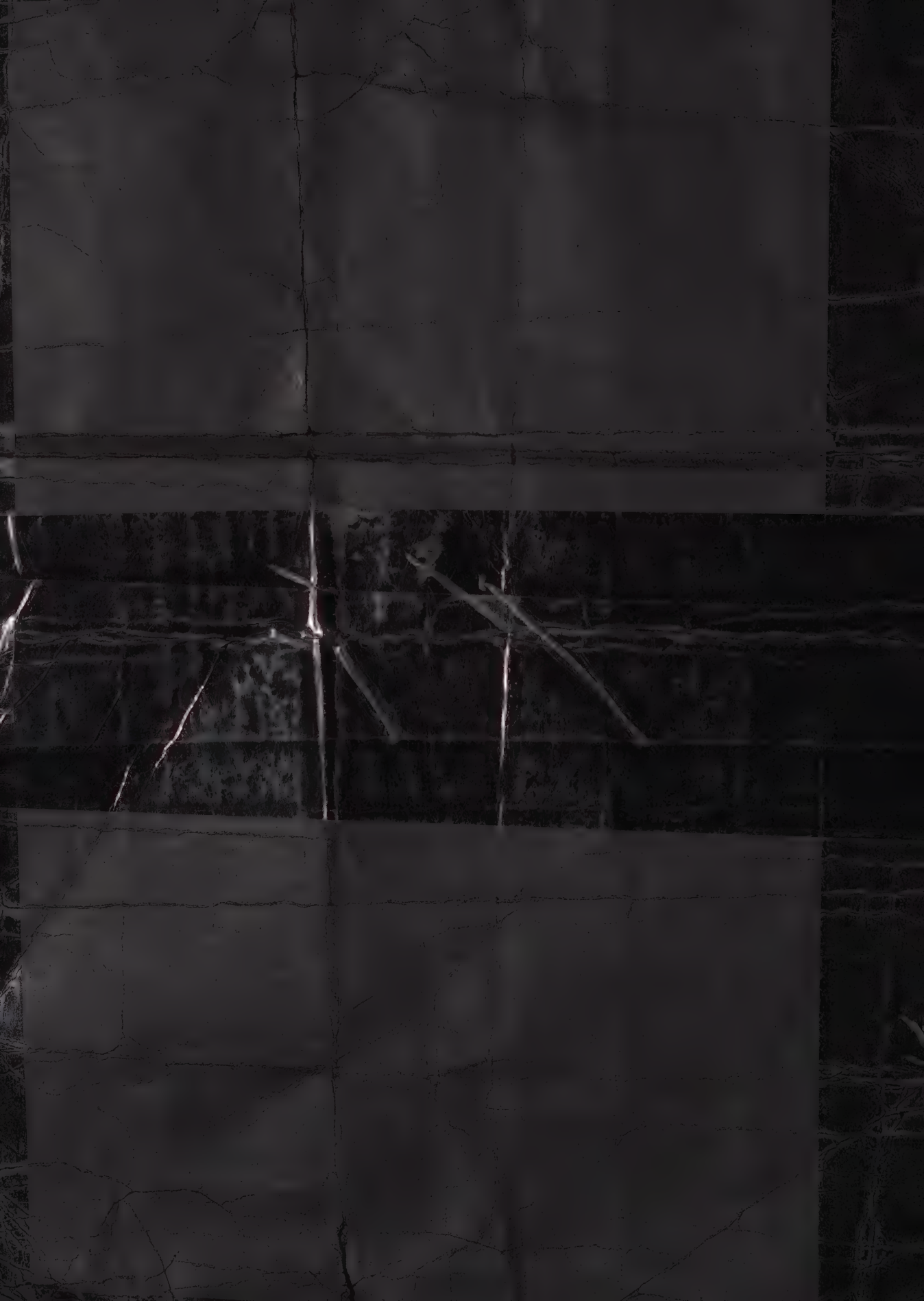
46. ΔF Indicator

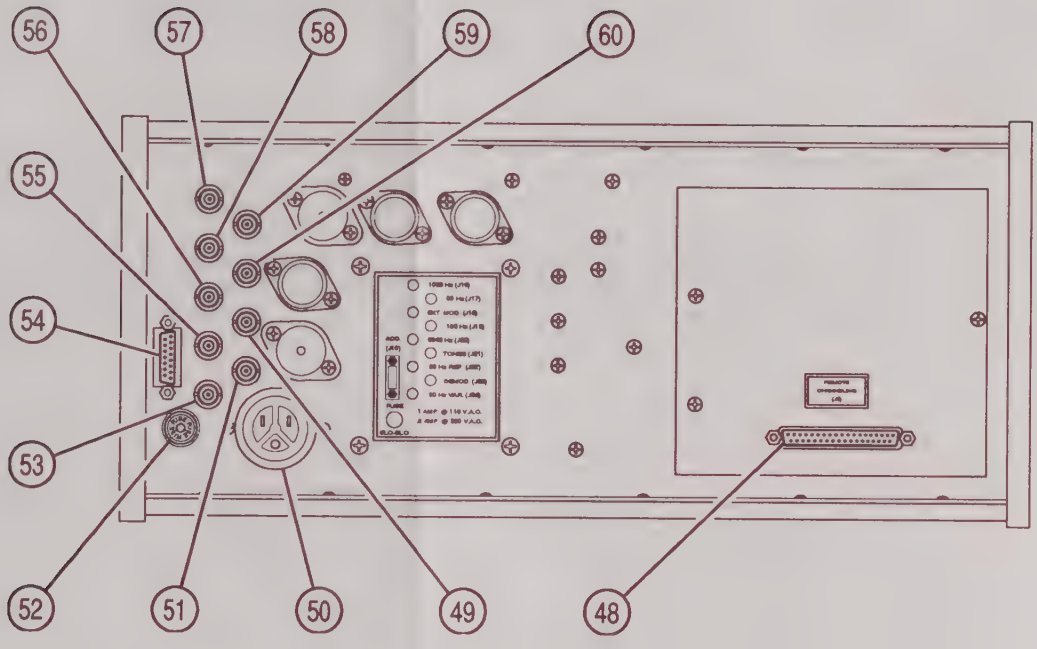
    Illuminates when ΔF Control (1) is not in calibrated detent position.

47. AUDIO LEVEL Control

    Adjusts audio level applied to speaker. During channeling, when AUTO-MANUAL FREQUENCY CONTROL Switch (8) is set to AUTO, a short tone burst indicates when NAV-750B is advanced to a different frequency.



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48. REMOTE CHANNELING OUTPUT Connector (J8)
49. SUM-OF-TONES OUTPUT Connector (J21)
50. AC INPUT CONNECTOR (P15)
51. RF DEMOD OUTPUT Connector (J23)
52. AC LINE FUSE
53. 30 Hz VARIABLE TONE OUTPUT Connector (J24)
54. ACCESSORY Connector (J10)
55. 30 Hz REFERENCE TONE OUTPUT Connector (J22)
56. 9960 Hz TONE OUTPUT Connector (J20)
57. 1020 Hz IDENT TONE OUTPUT Connector (J16)
58. EXTERNAL MODULATION INPUT Connector (J18)
59. 90 Hz TONE OUTPUT Connector (J17)
60. 150 Hz TONE OUTPUT Connector (J19)

NAV-750B Rear Panel
Figure 2

B. Rear Panel (2-2-2, Figure 2)

ITEM	DESCRIPTION

48. REMOTE CHANNELING OUTPUT Connector (J8)

    Provides parallel BCD and ARINC 2-out-of-5 code channeling information to remotely control a receiver to track output frequency of NAV-750B (2-2-4, Figure 5).

49. SUM-OF-TONES OUTPUT Connector (J21)

    Provides sum of all tones for mode in use.

50. AC INPUT Connector (P15)

    Receives ac power.

    NOTE: For 230 VAC (50/60 Hz) operation, primary windings of power transformer must be rewired.

51. RF DEMOD OUTPUT Connector (J23)

    Provides demodulated RF output signal. Includes dc offset of approximately 3.76 V.

52. AC LINE Fuse

    Fuse receptacle for ac power input: 1.0 A at 115 VAC or 0.5 A at 230 VAC.

53. 30 Hz VARIABLE TONE OUTPUT Connector (J24)

    Provides 30 Hz variable tone for external use.

54. ACCESSORY Connector (J10)

    Provides I/O access for external testing and monitoring.

55. 30 Hz REFERENCE TONE OUTPUT Connector (J22)

    Provides 30 Hz reference tone for external use.

56. 9960 Hz TONE OUTPUT Connector (J20)

    Provides 9960 Hz tone for external use.

57. 1020 Hz IDENT TONE OUTPUT Connector (J16)

    Provides 1020 Hz tone for external use.

ITEM DESCRIPTION

58. EXTERNAL MODULATION INPUT Connector (J18)

External audio tones are applied to add modulation to any signal (Input Impedance: 1 kΩ nominal).

NOTE: EXTERNAL MODULATION INPUT Connector must be terminated with 100 Ω or less when not in use.

59. 90 Hz TONE OUTPUT Connector (J17)

Provides 90 Hz tone for external use.

60. 150 Hz TONE OUTPUT Connector (J19)

Provides 150 Hz tone for external use.

3. Performance Evaluation

A. General

The Performance Evaluation contains a general performance procedure to evaluate the operating condition of the NAV-750B.

B. Pre-Operational Considerations

For maximum benefit, it is strongly recommended that personnel:

- Throughly read and understand all steps of procedure to be performed, prior to completion.
- Be familiar with unit under test as to power, frequency and waveform to be expected at each test point.

C. Controls, Connectors and Indicators

The Controls, Connectors and Indicators specified in the Performance Evaluation Procedure are followed by an item number. Refer to 1-2-2, Figure 1 for the location of each Control, Connector and Indicator.

D. Corrective Maintenance Procedures

The Performance Evaluation Procedure aids the technician in determining if the NAV-750B is functioning properly or a failure condition exists. A failure condition is reflected as a calibration error (measurement or reading not within prescribed tolerance) or a malfunction (signal is absent or grossly out of tolerance).

If a failure condition is confirmed, technician should take appropriate action to return NAV-750B to normal operating condition by referring to 2-2-2 and 2-2-3 in NAV-750B Maintenance Manual.

E. Performance Evaluation Procedure

STEP	PROCEDURE

1. Set NAV-750B controls as follows:

CONTROL	SETTING
(1) ΔF Control	***ccw***
(3) BEARING-FREQUENCY DISPLAY Switch	***BEARING***
(4) FREQUENCY RESOLUTION Switch	***kHz***
(6) RF OUTPUT ATTENUATOR	***-120***
(7) CHANNELING RATE Control	***ccw***
(8) AUTO-MANUAL FREQUENCY CONTROL Switch	***MANUAL***
(10) FREQUENCY SELECTOR Switches	***108.000***
(14) G/S DDM SELECTOR Switch	***0***
(15) CHANNELING FREQUENCY INCREMENT Switch	***25***
(18) G/S VARIABLE DDM Control	***0***
(19) LOC-G/S FREQUENCY SELECT Switch	***LOC***
(22) LOC VARIABLE DDM Control	***0***
(23) LOC DDM SELECTOR Switch	***0***
(27) VARIABLE BEARING SELECT Switch	***.01***
(28) 9960 Hz TONE MODULATION LEVEL Control	***CAL***
(29) 30 Hz TONE MODULATION LEVEL Control	***CAL***
(34) 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control	***CAL***
(35) TO-FROM BEARING Switch	***FROM***
(39) METER FUNCTION AND TONE SELECTOR Switch	***0-100***
(41) MASTER MODULATION LEVEL Control	***CAL***

2. Set METER FUNCTION AND TONE SELECTOR Switch (39) to ***ZERO***. Verify ***0.00*** on BEARING-FREQUENCY Display (2).

3. Press ***90*** on VOR BEARING SELECT Pushbutton Switches (32). Verify ***90.00*** on BEARING-FREQUENCY Display (2).

4. Adjust BEARING ZERO ADJUST Control (45) to center METER (43) needle.

5. Set TO-FROM BEARING Switch (35) to ***TO***.

6. Set METER FUNCTION AND TONE SELECTOR Switch (39) to ***BRG***. Verify ***BRG ZERO*** (±0.05°) on METER (43).

7. Set TO-FROM BEARING Switch (35) to ***FROM***. Verify ***BRG ZERO*** (±0.05°) on METER (43).

8. Press ***270*** on VOR BEARING SELECT Pushbutton Switches (32). Verify ***BRG ZERO*** (±0.05°) on METER (43).

9. Set TO-FROM BEARING Switch (35) to ***TO***. Verify ***BRG ZERO*** (±0.05°) on METER (43).

10. Set METER FUNCTION AND TONE SELECTOR Switch (39) to ***ZERO***. Verify ***BRG ZERO*** (±0.05°) on METER (43).

4. General Operating Procedures

A. General

The following information is intended to supplement the user's test procedures relating to specific equipment and demonstrate the capability of the NAV-750B.

(1) Operating Modes and Tone Modulations

The NAV-750B operates in VOR, LOC, G/S, COMM and MKR modes. Each mode is chosen by selecting the appropriate carrier frequency. The Automatic Channeling feature allows receiver channeling in 25, 50, 100 or 200 kHz increments. While operating in LOC mode, the appropriately paired G/S channel is instantly selected by setting LOC-G/S FREQUENCY SELECT Switch (19) to G/S.

In VOR mode, RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard VOR signal consisting of:

NOTE: 9960 Hz frequency is modulated at a deviation ratio of 16 by the 30 Hz Reference Tone.

TONE	% MODULATION
30 Hz VAR	30%
9960 Hz	30%

In LOC mode, RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard LOC signal consisting of:

TONE	% MODULATION
90 Hz	20%
150 Hz	20%

In G/S mode, RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard G/S signal consisting of:

TONE	% MODULATION
90 Hz	40%
150 Hz	40%

In VOR, LOC, and G/S modes, the 1020 Hz IDENT tone may be added from 0 to 60% modulation by rotating 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control (34) cw.

In COMM mode, RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a 1020 Hz IDENT signal at 30%.

In MKR mode, RF output is modulated at 95% by a MKR tone selected by METER FUNCTION AND TONE SELECTOR Switch (39). When METER FUNCTION AND TONE SELECTOR Switch (39) is not set to a MKR tone, RF output (70.000 to 79.900 MHz) is automatically modulated with 1020 Hz tone at 95%.

(2) Equipment Connections

Connections to a NAV-COMM receiver are shown in 1-2-4, Figure 3. Only the antenna lead needs to be connected if remote channeling is not used. For remote channeling pin out connections to REMOTE CHANNELING OUTPUT Connector (J8) (48), refer to 1-2-4, Figure 4. 1-2-4, Figure 4 also provides ARINC 2-out-of-5 code information available at REMOTE CHANNELING OUTPUT Connector (J8) (48). Relay outputs provide ARINC 2-out-of-5 code and transistors provide parallel BCD code. A 37 position connector is supplied with the NAV-750B for use in constructing a remote channeling cable between REMOTE CHANNELING OUTPUT Connector (J8) (48) and UUT.

B. General Operating Procedures Initial Control Settings

Refer to 1-2-2, Figure 2 for location of NAV-750B Controls.

CONTROL	SETTING
(1) ΔF Control	***ccw***
(3) BEARING-FREQUENCY DISPLAY Switch	***BEARING***
(4) FREQUENCY RESOLUTION Switch	***kHz***
(6) RF OUTPUT ATTENUATOR	***-120***
(7) CHANNELING RATE Control	***ccw***
(8) AUTO-MANUAL FREQUENCY CONTROL Switch	***MANUAL***
(10) FREQUENCY SELECTOR Switches	***108.000***
(14) G/S DDM SELECTOR Switch	***0***
(15) CHANNELING FREQUENCY INCREMENT Switch	***25***
(18) G/S VARIABLE DDM Control	***0***
(19) LOC-G/S FREQUENCY SELECT Switch	***LOC***
(22) LOC VARIABLE DDM Control	***0***
(23) LOC DDM SELECTOR Switch	***0***
(27) VARIABLE BEARING SELECT Switch	***.01***
(28) 9960 Hz TONE MODULATION LEVEL Control	***CAL***
(29) 30 Hz TONE MODULATION LEVEL Control	***CAL***
(34) 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control	***CAL***
(35) TO-FROM BEARING Switch	***FROM***
(39) METER FUNCTION AND TONE SELECTOR Switch	***0-100***
(41) MASTER MODULATION LEVEL Control	***CAL***

C. NAV-750B Test Examples

TEST EXAMPLE — PAGE

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VOR Receiver System Bearing Accuracy Test Example 8
VOR Receiver Bearing Accuracy while Varying 30 Hz VAR Tone Modulation (±5%) Test Example 9
VOR Receiver Bearing Accuracy while Varying RF Test Example 10
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LOC CDI Deflection AGC Characteristics and Deflection Balance Test Example 22
LOC RF Sensitivity Test Example 23
LOC Warning Signal Test Example 24
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G/S System Test Examples 27
G/S Centering Accuracy Test Example 28
G/S CDI Deflection AGC Characteristics and Deflection Balance Test Example 31
G/S Warning Signal Test Example 32
CDI G/S Deviation Indication Test Example 34
COMM Receiver Test Example 35
COMM Receiver Channel Gain Test Example 35
MKR Receiver Test Example 36
MKR Receiver Selectivity Test 36

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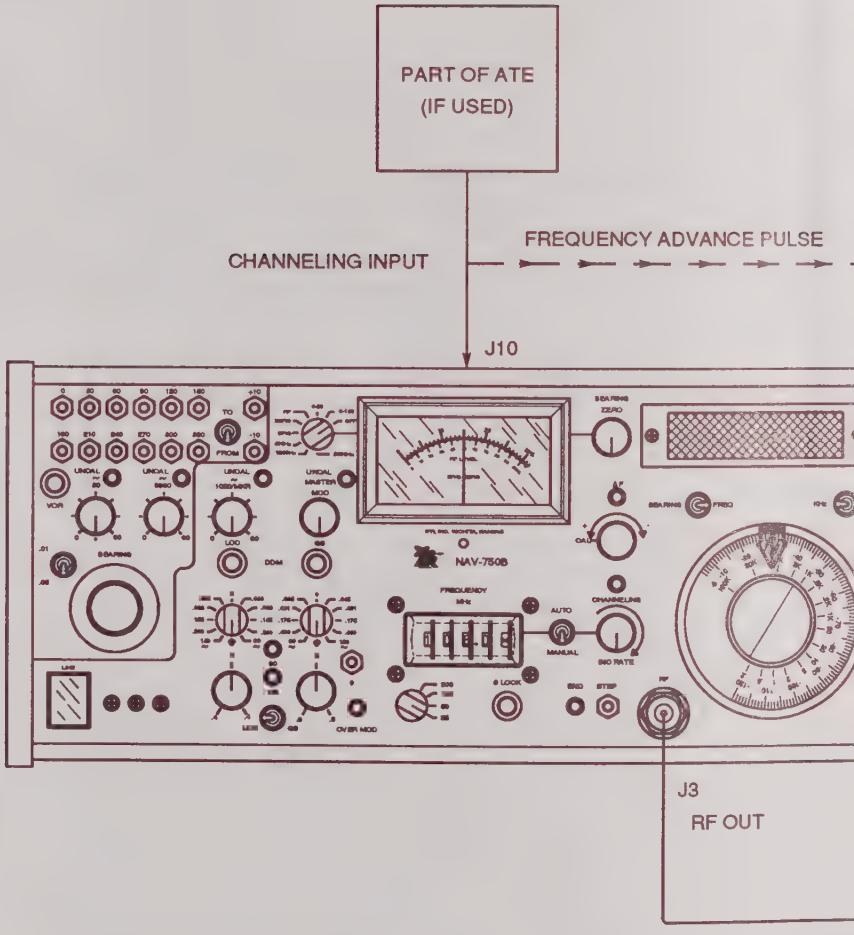
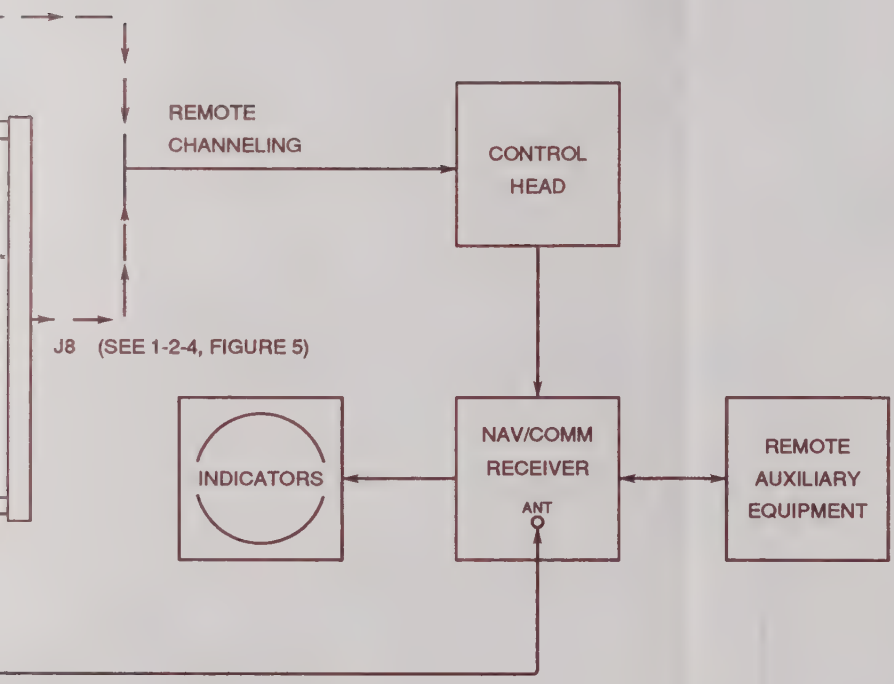

PART OF ATE
(IF USED)
CHANNELING INPUT
FREQUENCY ADVANCE PULSE
J10
NAV-750B
J3
RF OUT



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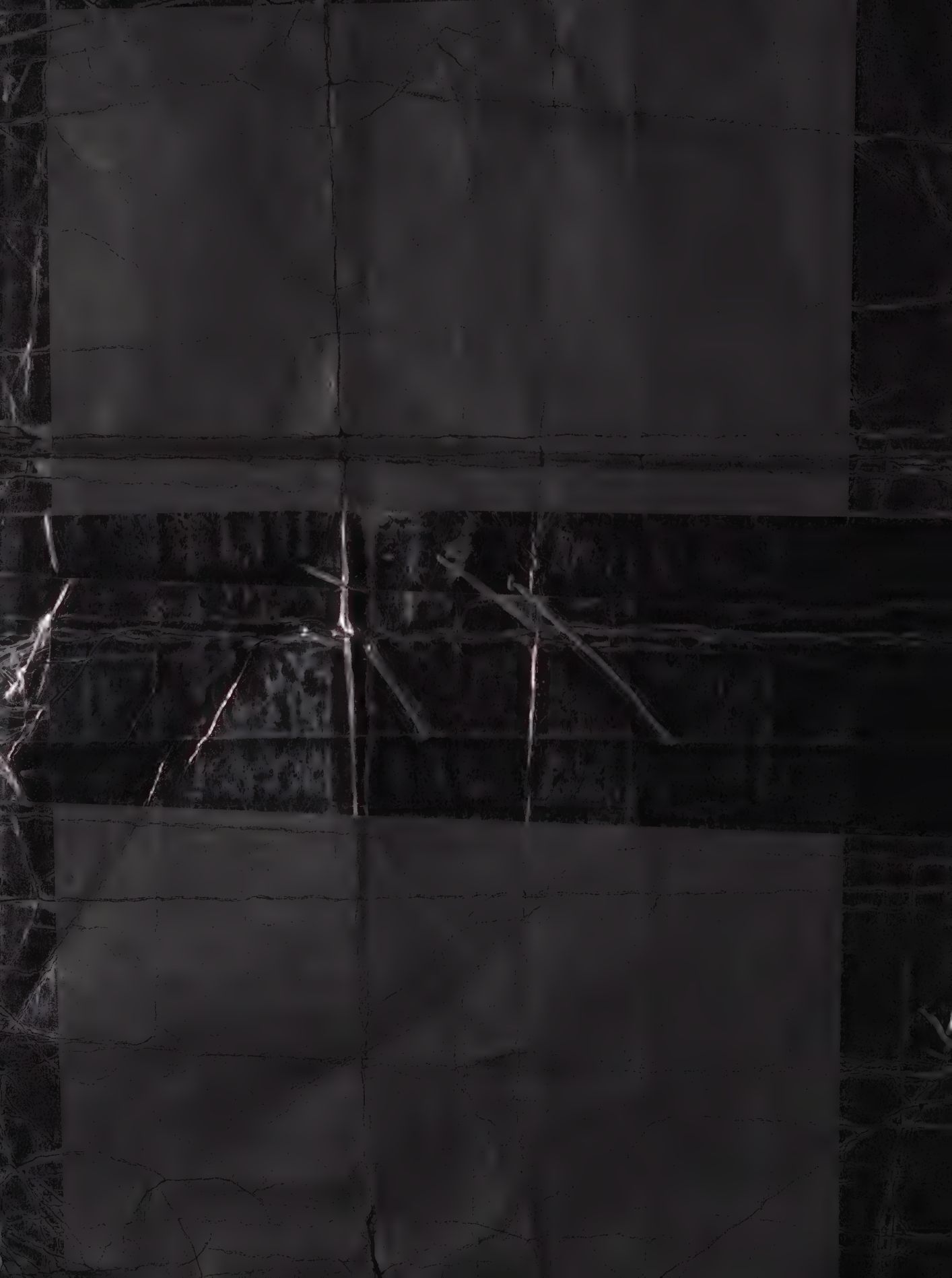
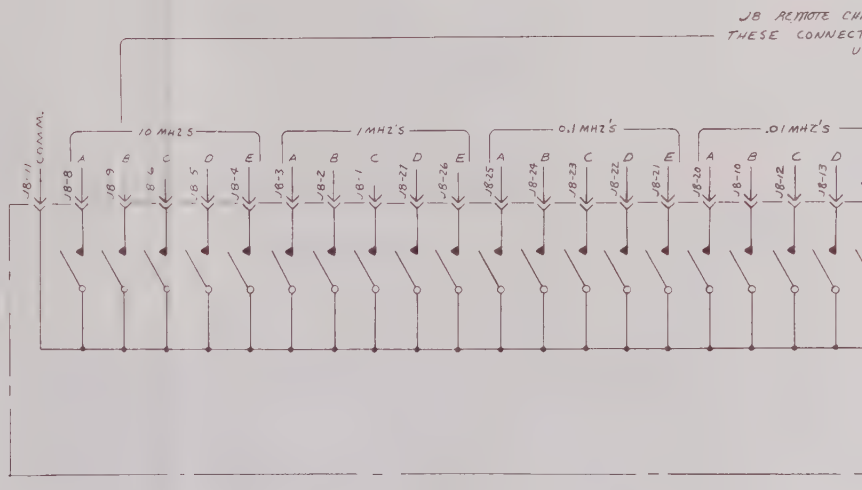
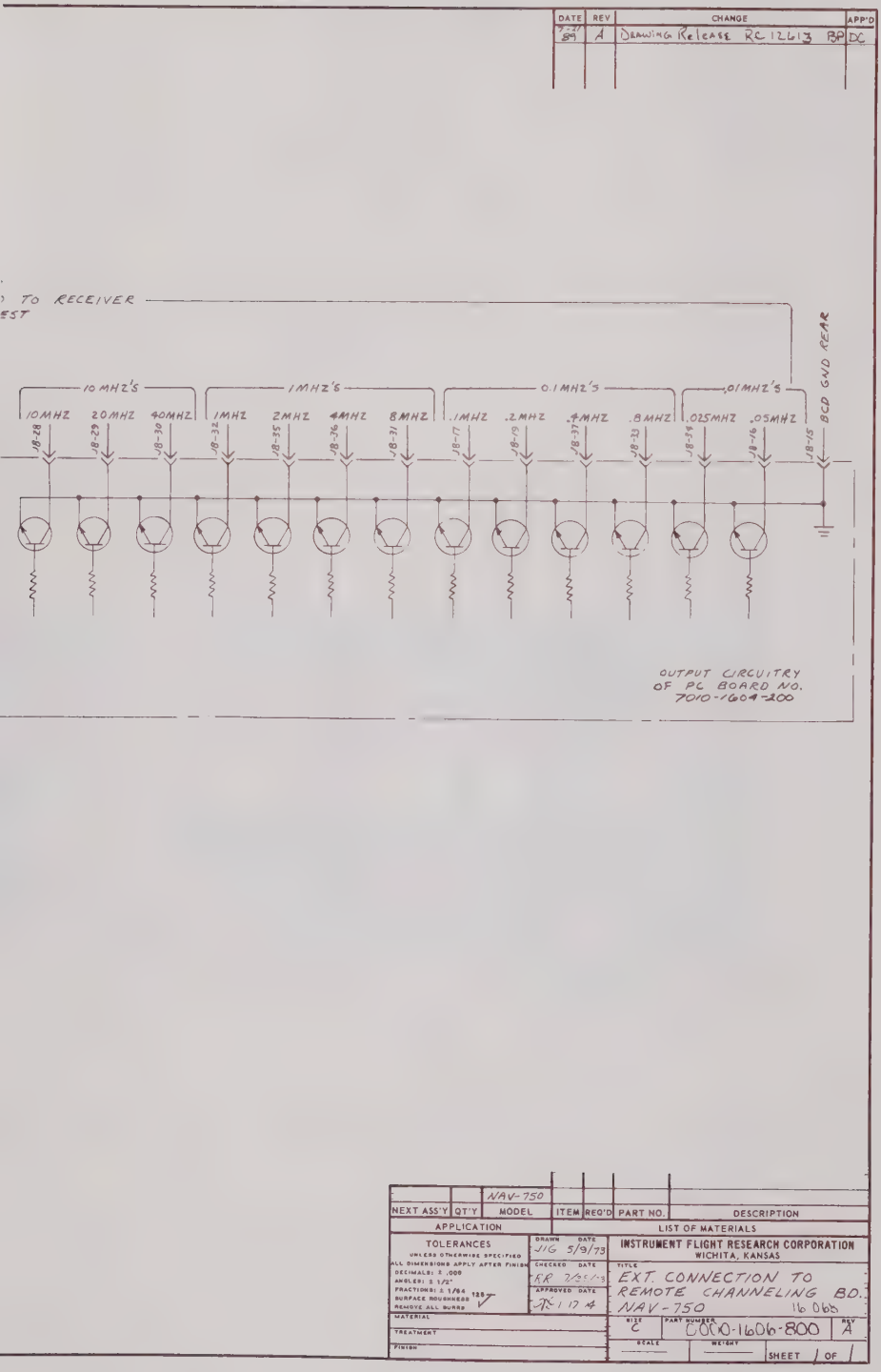
Connections to NAV-COMM Receiver
Figure 3





	0	1	2	3	4	5	6	7	8	9
			25			50		75		
A		X	X						X	X
B	X	X		X	X					
C			X	X		X	X			
D					X	X		X	X	
E	X						X	X		X

FREQUENCY SELECTOR TWO-OUT-OF-FIVE BINARY CODE



Remote Channeling Pin Out Connections
Figure 4

(1) VOR Receiver Test Examples

(a) General

The NAV-750B automatically produces a standard VOR test signal, variable in RF level from -120 to -6 dBm (0.22 to 112.000 µV into a 50 Ω load), whenever a VOR frequency is selected. The 30 Hz VAR tone percentage of modulation is varied from 0% to 50% with 30 Hz TONE MODULATION LEVEL Control (29) when rotated out of calibrated detent position. The 9960 Hz Tone (frequency modulated with 30 Hz REF tone) percentage of modulation is varied from 0% to 50% with 9960 Hz TONE MODULATION LEVEL Control (28) when rotated out of calibrated detent position. The 1020 Hz IDENT tone is normally OFF in VOR and is added by rotating 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control (34) cw. The MASTER MODULATION LEVEL Control (41) varies all tone percent modulation levels from 0% to 60% when rotated out of calibrated detent position. VOR bearings are selected using VOR BEARING SELECT Pushbutton Switches (32), +10° BEARING Pushbutton Switch (37), -10° BEARING Pushbutton Switch (36) or VARIABLE BEARING Control (26). The generated bearing is displayed when BEARING- FREQUENCY DISPLAY Switch (3) is set to BEARING.

VOR Test Signal Definitions are as follows:

- Standard VOR Test Signal

  An RF VOR frequency, amplitude modulated simultaneously at 30% with a 9960 Hz subcarrier, is frequency modulated at a deviation ratio of 16 by 30 Hz Reference phase tone. A 30 Hz Variable phase tone at 30% is varied in phase with respect to the reference phase tone. The RF level of the Standard VOR Test Signal is 1000 µV.

- Standard Centering Signal

  A Standard VOR Test Signal where difference in phase between reference and variable phase 30 Hz tones is equal to setting of UUT omni-bearing course selector.

- Standard Deflection Signal

  A Standard VOR Test Signal of 100 µV where difference in phase between reference and variable phase 30 Hz tones is 10°. This produces an on-course CDI indication.

(b) VOR Receiver System Bearing Accuracy Test Example

STEP	PROCEDURE
1.	Set NAV-750B controls as shown in 1-2-4B.
2.	Set RF OUTPUT ATTENUATOR (6) to ***-47***.
3.	Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).
4.	Set Omni-Bearing Selector to 0°.
5.	Verify CDI pointer is centered and ambiguity indicator indicates FROM.
6.	Set TO-FROM BEARING Switch (35) to ***TO***.
7.	Verify ambiguity indicator indicates TO and CDI pointer is centered.
8.	Repeat Steps 3 through 7 for remaining VOR BEARING SELECT Pushbutton Switches (32).

(c) VOR Receiver Bearing Accuracy while Varying 30 Hz VAR Tone Modulation (±5%) Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-47***.
3. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).
4. Set Omni-Bearing Selector to 0°.
5. Verify CDI pointer is centered and ambiguity indicator indicates FROM.
6. Verify approximately ***60%*** modulation indication on METER (43). Rotate 30 Hz TONE MODULATION LEVEL Control (29) cw until ***60%*** modulation is on METER (43).
7. Rotate 30 Hz TONE MODULATION LEVEL Control (29) ±***5%***. Verify ±***5%*** modulation change on METER (43). Record CDI pointer error.
8. Set TO-FROM BEARING Switch (35) to ***TO*** and repeat Step 7.
9. Repeat Steps 3 through 8 for remaining VOR BEARING SELECT Pushbutton Switches (32).

(d) VOR Receiver Bearing Accuracy while Varying RF Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING- FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-47***

3. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).
4. Set Omni-Bearing Selector to 0°.
5. Verify CDI pointer is centered and ambiguity indicator is FROM.
6. Rotate ΔF Control (1) cw to offset carrier frequency between limits specified by Manufacturer. Record CDI pointer error.
7. Set TO-FROM BEARING Switch (35) to ***TO*** and repeat Step 6.
8. Repeat Steps 3 through 7 for remaining VOR BEARING SELECT Pushbutton Switches (32).

(e) VOR Receiver Accuracy while Varying RF Signal Level Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-47***.
3. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).
4. Set Omni-Bearing Selector to 0°.
5. Verify CDI pointer is centered and ambiguity indicator indicates FROM.
6. Rotate RF OUTPUT ATTENUATOR (6) from ***-87*** to ***-21***. Record CDI pointer error.
7. Set TO-FROM BEARING Switch (35) to ***TO*** and repeat Step 6.
8. Repeat Steps 3 through 7 for remaining VOR BEARING SELECT Pushbutton Switches (32).

(f) VOR CDI Test Example

STEP	PROCEDURE

CDI POINTER DEFLECTION SENSITIVITY

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-67***.
3. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).
4. Set Omni-Bearing Selector to 0°.
5. Verify CDI pointer is centered and ambiguity indicator indicates FROM.
6. Press +10° BEARING Pushbutton Switch (37). Verify ***10°*** bearing increase on METER (43). Record CDI pointer deflection.
7. Vary RF OUTPUT ATTENUATOR (6) from ***-87*** to ***-21***. Record CDI pointer variation.
8. Press -10° BEARING Pushbutton Switch (36) twice. Verify ***-20°*** bearing change on METER (43). Record CDI pointer deflection.
9. Repeat Step 8 and record CDI pointer variation.
10. Compare results in Steps 6, 8 and 9 with UUT Manufacturer's specifications.

CDI POINTER RESPONSE TIME

11. Set RF OUTPUT ATTENUATOR (6) to ***-67***. Press +10° BEARING SELECT Pushbutton Switch (37) for an on-course CDI indication.
12. Press +10° BEARING SELECT Pushbutton Switch (37). Record time required for CDI pointer to deflect ***70%*** of maximum deflection.
13. Press -10° BEARING SELECT Pushbutton Switch (36) for an on-course CDI indication. Press -10° BEARING SELECT Pushbutton Switch (36). Record time required for CDI pointer to deflect 70% of maximum deflection.
14. Compare results in Steps 12 and 13 with UUT Manufacturer's specifications.

CDI POINTER LINEARITY

15. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32). Rotate VARIABLE BEARING Control (26) for an on-course (FROM) CDI indication.
16. Rotate VARIABLE BEARING Control (26) in ***2°*** increments to ***10°***. Record CDI pointer 2° increments. Verify increments are equal.

STEP	PROCEDURE

17. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32). Rotate VARIABLE BEARING Control (26) in ***2°*** increments to ***10°***. Record CDI pointer 2° increments. Verify increments are equal.

(g) CDI Ambiguity (TO-FROM) Indicator Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-47***.
3. Select test signal on NAV-750B for an on-course (FROM) indicator on CDI.
4. Rotate VARIABLE BEARING Control (26) ±***60°***. Verify CDI indicator remains FROM.
5. Set TO-FROM BEARING Switch (35) to ***TO***. Rotate VARIABLE BEARING Control (26) ±***60°***. Verify CDI indicator remains TO.
6. Repeat Steps 3 through 5 at various RF OUTPUT ATTENUATOR (6) settings between ***-87*** and ***-21***.

(h) CDI Alarm Signal (Warning Flag) Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-67***.

NORMAL SIGNAL

3. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

NORMAL SIGNAL FLUCTUATING RF

4. Rotate RF OUTPUT ATTENUATOR (6) from ***-87*** to ***-21***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

SIGNAL ABSENT

5. Set RF OUTPUT ATTENUATOR (6) to ***-112***. Disconnect cable from RF OUTPUT Connector (J3) (9). Verify Alarm Signal (Warning Flag) is visible.

MISSING 9960 Hz TONE

6. Connect cable to RF OUTPUT Connector (J3) (9). Set RF OUTPUT ATTENUATOR (6) to ***-67***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.
7. Set 9960 Hz TONE MODULATION LEVEL Control (28) to ***UNCAL fully ccw (0)***. Verify Alarm Signal (Warning Flag) is visible.
8. Rotate RF OUTPUT ATTENUATOR (6) from ***-87*** to ***-21***. Verify Alarm Signal (Warning Flag) remains visible.

MISSING 30 Hz TONE

9. Set 9960 Hz TONE MODULATION LEVEL Control (28) to ***CAL***.
10. Set 30 Hz TONE MODULATION LEVEL Control (29) to ***UNCAL fully ccw (0)***. Verify Alarm Signal (Warning Flag) is visible.
11. Rotate RF OUTPUT ATTENUATOR (6) from ***-87*** to ***-21***. Verify Alarm Signal (Warning Flag) remains visible.

MARGINAL SIGNAL STRENGTH

12. Set 30 Hz TONE MODULATION LEVEL Control (29) to ***CAL***.
13. Set RF OUTPUT ATTENUATOR (6) to ***-67***.
14. Set Omni-Bearing Selector to 0 FROM.
15. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32).

STEP	PROCEDURE

16. Use VARIABLE BEARING Control (26), as needed, to center CDI pointer.

17. Press +10° BEARING PUSHBUTTON Switch (37). Verify CDI pointer is deflected for 10° course deviation. Record deviation.

18. Decrease RF OUTPUT ATTENUATOR (6) for 50% of CDI pointer deflection recorded in Step 17. Verify Warning Flag begins to enter alarm condition.

(i) VOR Receiver Sensitivity Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set RF OUTPUT ATTENUATOR (6) to ***-67***.
3. Rotate VARIABLE BEARING Control (26) for an on-course (FROM) indicator on CDI.
4. Press +10° BEARING Pushbutton Switch (37) or -10° BEARING Pushbutton Switch (36) for Standard Deflection signal. Verify ***10°*** change on METER (43). Verify CDI pointer is deflected appropriately (Standard Deflection).
5. Rotate RF OUTPUT ATTENUATOR (6) until deflection of CDI pointer is 50% of Standard Deflection in Step 4.
6. Refer to Appendix A to determine receiver sensitivity, using RF OUTPUT ATTENUATOR (6) setting in Step 5.
7. Repeat Steps 5 and 6 for each VOR channel.

(2) Automatic Frequency Channeling Test Example

(a) General

The NAV-750B automatically channels UP, in frequency only, a VHF NAV-COMM receiver. The frequency increment (25, 50, 100 or 200 kHz) is selected with CHANNELING FREQUENCY INCREMENT Switch (15), according to NAV-COMM receiver channel spacing. Setting AUTO-MANUAL FREQUENCY CONTROL Switch (8) to AUTO and rotating CHANNELING RATE Control (7) cw allows the operator to select a convenient channeling rate from 0 to a maximum of 4 advances per second. An audio tone announces each incremental advance and BEARING-FREQUENCY Display (2) indicates RF output if BEARING-FREQUENCY DISPLAY Switch (3) is set to FREQ.

(b) NAV-COMM AUTO Channeling Test Example

NOTE: The NAV-750B Auto-Channeling system stops automatically at 117.950, 135.975 and 157.950 MHz. To continue channeling, when stopped at 117.950 and 135.975 MHz, set AUTO-MANUAL FREQUENCY CONTROL Switch (8) to MANUAL and select frequency of next channel manually on FREQUENCY SELECTOR Switches (10). When AUTO-MANUAL FREQUENCY CONTROL Switch (8) is returned to AUTO, channeling continues from manually selected frequency.

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.
2. Set BEARING-FREQUENCY DISPLAY Switch (3) to ***FREQ***.
3. Rotate CHANNELING RATE Control (7) ***fully ccw***.
4. Set AUTO-MANUAL FREQUENCY CONTROL Switch (8) to ***AUTO***.
5. Rotate CHANNELING RATE CONTROL (7) ***cw*** to set desired channeling rate.
6. Verify output is appropriate for input signal at each channel.

   NOTE: Channeling is stopped at any time by rotating CHANNELING RATE Control (7) ***fully ccw***.

(3) ILS LOC Receiver Test Examples

(a) General

In LOC mode, when LOC MODE Indicator (25) is ON, NAV-750B produces a variable RF output signal from -120 to -6 dBm in the 108.000 to 112.000 MHz band. RF is modulated simultaneously with 90 Hz and 150 Hz tones at 20%. Specific depth of modulation relationships between these tones is available with LOC DDM SELECTOR Switch (23). Continuously variable DDM control is available with LOC VARIABLE DDM Control (22). Right rotation of LOC DDM SELECTOR Switch (23) or LOC VARIABLE DDM Control (22) results in right deflection of CDI pointer and left deflection of LOC DDM SELECTOR Switch (23) or LOC VARIABLE DDM Control (22) results in left deflection of CDI pointer.

- Standard LOC Test Signal Definition

  An RF carrier amplitude modulated simultaneously with 90 and 150 Hz tones so sum of separate modulation percentages equals 40% (±2%).

- Standard LOC Centering Signal Definition

  A Standard LOC Test Signal where difference in depth of modulation (DDM) of 90 and 150 Hz tones is <0.002 (0.1 dB) and CDI pointer is centered.

- Standard LOC Deviation Signal Definition

  A Standard LOC Test Signal where difference in depth of modulation (DDM) of 90 and 150 Hz tones is 0.093 (4 dB). In indicators, where deflection from center to full scale is linear, standard deflection of CDI pointer is 60% (90 µA) of full scale deflection.

- Difference in Depth of Modulation (DDM) Definition

  Percentage modulation depth of larger tone (90 or 150 Hz) minus percentage modulation depth of smaller tone, divided by 100.

(b) LOC Centering Accuracy Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-47***
(10) FREQUENCY SELECTOR Switches	***108.100***

STANDARD LOC CENTERING SIGNAL

3. Center CDI LOC deviation pointer. Record any centering error or pointer deflection.

CARRIER LEVEL VARIATION

4. Rotate RF OUTPUT ATTENUATOR (6) from ***-73*** to ***-27***. Record centering error due to carrier level variation or pointer deflection.

CARRIER FREQUENCY VARIATION

5. Set RF OUTPUT ATTENUATOR (6) to ***-47***.

6. Rotate ΔF Control (1) ±***9 kHz***. Record CDI pointer variation.

7. Repeat Step 6 for each LOC frequency.

8. Set ΔF Control (1) to ***CAL***.

SIMULTANEOUS VARIATION OF 90 AND 150 Hz TONE MODULATION PERCENTAGES

9. Rotate MASTER MODULATION LEVEL Control (41) cw ***4%*** above modulation indication on METER (43). Record centering error due to modulation variation or pointer deflection.

VARIATION OF 90 AND 150 Hz TONE PHASE RELATIONSHIP (±12 of COMMON 30 Hz SUBHARMONIC)

10. Set NAV-750B controls as follows:

CONTROL	SETTING
(14) G/S DDM SELECTOR Switch	***150***
(23) LOC DDM SELECTOR Switch	***90***

11. Verify METER (43) indicates ***0%*** modulation.

12. Rotate 1020 Hz IDENT AND MKR TONE MODULATION LEVEL Control (34) ***cw*** until ***30%*** modulation is on METER (43).

STEP PROCEDURE

13. Set NAV-750B controls as follows:

CONTROL	SETTING
(14) G/S DDM SELECTOR Switch	***0***
(23) LOC DDM SELECTOR Switch	***0***

14. Set BEARING-FREQUENCY DISPLAY Switch (3) to ***BEARING***.

15. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32). Verify ***0.00*** on BEARING-FREQUENCY Display (2).

16. Rotate VARIABLE BEARING Control (26) ***cw*** until ***12.00*** is on BEARING-FREQUENCY Display (2).

17. Press and hold 90 Hz-150 Hz PHASE DEVIATION Switch (16). Record centering error. Release 90 Hz-150 Hz PHASE DEVIATION Switch (16).

18. Record centering error, due to tone phase shift, in pointer deflection.

19. Rotate VARIABLE BEARING Control (26) ***ccw*** until ***348.00*** is on BEARING-FREQUENCY Display (2).

20. Press and hold 90 Hz-150 Hz PHASE DEVIATION Switch (16). Record centering error. Release 90 Hz-150 Hz PHASE DEVIATION Switch (16).

21. Record centering error, due to tone phase shift, in pointer deflection.

(c) LOC CDI Deflection AGC Characteristics and Deflection Balance Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(6) RF OUTPUT ATTENUATOR	***-47***
(10) FREQUENCY SELECTOR Switches	***108.100***

3. Set LOC DDM SELECTOR Switch (23) to ***Left 0.155***. Verify CDI pointer deflection is Left full scale.

4. Set LOC DDM SELECTOR Switch (23) to ***Right 0.155***. Verify CDI pointer deflection is Right full scale.

5. Set LOC DDM SELECTOR Switch (23) to ***0***. Verify CDI pointer is centered.

6. Set LOC DDM SELECTOR Switch (23) to ***Left 0.093***. Verify CDI pointer is Left Standard Deflection (60% of full scale).

7. Rotate RF OUTPUT ATTENUATOR (6) from ***-73*** to ***-27***. Record effect of RF level variation on CDI pointer deflection.

8. Set LOC DDM SELECTOR Switch (23) to ***Right 0.093***. Verify CDI pointer is Right Standard Deflection (60% of full scale).

9. Rotate RF OUTPUT ATTENUATOR (6) from ***-73*** to ***-27***. Record effect of RF level variation on CDI pointer deflection.

(d) LOC RF Sensitivity Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-47***
(10) FREQUENCY SELECTOR Switches	***108.100***

3. Verify CDI pointer is centered.

4. Set LOC DDM SELECTOR Switch (23) to ***Left 0.093*** or ***Right 0.093***. Verify CDI pointer is deflected 60% of full scale (Standard Deflection).

5. Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer deflection is 60% of Standard Deflection.

6. Refer to Appendix A to determine LOC RF sensitivity.

7. Repeat Steps 5 and 6 for each LOC channel.

(e) LOC Warning Signal Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-67***
(10) FREQUENCY SELECTOR Switches	***108.100***

NORMAL SIGNAL

3. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

NORMAL SIGNAL FLUCTUATING RF

4. Rotate RF OUTPUT ATTENUATOR (6) from ***-77*** to ***-27***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

RF SIGNAL ABSENT

5. Set RF OUTPUT ATTENUATOR (6) to ***-112*** and disconnect cable from RF OUTPUT Connector (J3) (9). Verify Alarm Signal (Warning Flag) is visible.

MISSING 90 Hz OR 150 Hz TONES

6. Connect cable to RF OUTPUT Connector (J3) (9). Set RF OUTPUT ATTENUATOR (6) to ***-67***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

7. Set G/S DDM SELECTOR Switch (14) to ***150 Hz***. Verify Alarm Signal (Warning Flag) is visible.

8. Set G/S DDM SELECTOR Switch (14) to ***90 Hz***. Verify Alarm Signal (Warning Flag) is visible.

MISSING 90 AND 150 Hz TONES

9. Set NAV-750B controls as follows:

CONTROL	SETTING
(23) LOC DDM SELECTOR Switch	***150***
(14) G/S DDM SELECTOR Switch	***90***

10. Verify Alarm Signal (Warning Flag) is visible.

STEP PROCEDURE

MARGINAL LOC SIGNAL STRENGTH

11. Set NAV-750B controls as follows:

CONTROL	SETTINGS
(6) RF OUTPUT ATTENUATOR	*-47*
(14) G/S DDM SELECTOR Switch	*0*
(23) LOC DDM SELECTOR Switch	*0.093*

12. Verify CDI pointer is at Standard Deflection (60% of full scale).

13. Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer is deflected 50% of Standard Deflection. Verify Alarm Signal (Warning Flag) is visible.

(f) ILS LOC Course Deviation Indication Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-47***
(10) FREQUENCY SELECTOR Switches	***108.100***

3. Verify CDI LOC pointer is centered.

CDI LOC DEFLECTION RESPONSE (0.155 DDM)

4. Set LOC DDM SELECTOR Switch (23) to ***Left 0.155***. Verify CDI pointer reaches 67% of full scale deflection within 2 seconds and then stops at full scale. Verify pointer overshoot is <5% of full scale deflection.

5. Set LOC DDM SELECTOR Switch (23) to ***Right 0.155***. Verify CDI pointer reaches 67% of full scale deflection within 2 seconds and then stops at full scale. Verify pointer overshoot is <5% of full scale deflection.

CDI LOC DEFLECTION (0.200 DDM)

6. Set LOC DDM SELECTOR Switch (23) to ***Right 0.200***. Verify pointer deflection remains at full scale.

7. Set LOC DDM SELECTOR Switch (23) to ***Left 0.200***. Verify pointer deflection remains at full scale.

CDI LOC REFLECTION (0.093 DDM)

8. Set LOC DDM SELECTOR Switch (23) to ***Left 0.093***. Verify pointer deflection is Left Standard.

9. Set LOC DDM SELECTOR Switch (23) to ***Right 0.093***. Verify pointer deflection is Right Standard.

CDI LOC DEFLECTION (0.046 DDM)

10. Set LOC DDM SELECTOR Switch (23) to ***Right 0.046***. Verify pointer deflection is Right Half Standard.

11. Set LOC DDM SELECTOR Switch (23) to ***Left 0.046***. Verify pointer deflection is Left Half Standard.

12. Set LOC DDM SELECTOR Switch (23) to ***0***. Verify pointer is centered.

(4) G/S System Test Examples

(a) General

The NAV-750B automatically provides a standard G/S signal, variable in RF level from -120 to -6 dBm (in 330 MHz band) (0.224 to 112,000 µV into a 50 Ω load) whenever a G/S frequency is selected. The G/S frequency is selected with FREQUENCY SELECTOR Switches (10) or by setting LOC-G/S FREQUENCY SELECT Switch (19) to G/S. When operating in LOC mode, LOC-G/S FREQUENCY SELECT Switch (19) automatically provides paired G/S frequency for selected LOC channel. As in LOC mode, RF is modulated with 90 Hz and 150 Hz tones. Tone Modulation is 40% for each tone. Specific depth of modulation relationships between these tones is available with G/S DDM SELECTOR Switch (14) Left and Right positions, which correspond to Down and Up CDI G/S pointer deflections.

- Standard G/S Test Signal Definition

  An RF signal carrier amplitude modulated simultaneously with 90 Hz and 150 Hz tones, each modulated at 40%.

- Standard G/S Centering Signal Definition

  A Standard G/S Test Signal where depth of modulation of 90 Hz and 150 Hz tones is equal (<0.002 DDM).

- Standard G/S Deviation Signal Definition

  A Standard G/S signal Test Signal where difference in depth of modulation of 90 Hz and 150 Hz tones is 0.091 DDM.

- Difference in Depth of Modulation (DDM) Definition

  Percentage modulation depth of larger tone (90 Hz or 150 Hz) minus percentage modulation depth of smaller tone, divided by 100.

(b) G/S Centering Accuracy Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-50***
(10) FREQUENCY SELECTOR Switches	***108.100***
(19) LOC-G/S FREQUENCY SELECT Switch	***G/S***

3. Verify ***334.700*** on BEARING-FREQUENCY Display (2).

STANDARD G/S CENTERING SIGNAL

4. Verify CDI G/S deviation pointer is centered. Record centering error.

CARRIER LEVEL VARIATION

5. Rotate RF OUTPUT ATTENUATOR (6) from ***-67*** to ***-27***. Record centering error due to carrier level variation.

CARRIER FREQUENCY VARIATION

6. Set RF OUTPUT ATTENUATOR (6) to ***-50***.

7. Rotate ΔF Control (1) ±***21 kHz***. Record maximum G/S pointer centering error due to carrier frequency variation.

8. Repeat Step 7 for each G/S Channel (1-2-4, Table 1).

9. Set ΔF Control (1) to ***CAL***.

SIMULTANEOUS VARIATION OF 90 AND 150 Hz TONE MODULATION PERCENTAGES

10. Rotate MASTER MODULATION LEVEL Control (41) ***5%*** from METER (43) indication. Record centering error due to modulation variation.

VARIATION OF 90 AND 150 Hz TONE PHASE RELATIONSHIP

11. Set BEARING-FREQUENCY DISPLAY Switch (3) to ***BEARING***.

12. Press ***0*** on VOR BEARING SELECT Pushbutton Switches (32). Verify ***0.00*** on BEARING-FREQUENCY Display (2).

13. Rotate VARIABLE BEARING Control (26) ***cw*** until ***12.00*** is on BEARING-FREQUENCY Display (2).

LOC	G/S
108.10	334.70
108.15	334.55
108.30	334.10
108.35	333.95
108.50	329.90
108.55	329.75
108.70	330.50
108.75	330.35
108.90	329.30
108.95	329.15
109.10	331.40
109.15	331.25
109.30	332.00
109.35	331.85
109.50	332.60
109.55	332.45
109.70	333.20
109.75	333.05
109.90	333.80
109.95	333.65
110.10	334.40
110.15	334.25
110.30	334.00
110.35	334.85
110.50	329.60
110.55	329.45
110.70	330.20
110.75	330.05
110.90	330.80
110.95	330.65
111.10	331.70
111.15	331.55
111.30	332.30
111.35	332.15
111.50	332.90
111.55	332.75
111.70	333.50
111.75	333.35
111.90	331.10
111.95	330.90

G/S Frequencies
Table 1

STEP	PROCEDURE

14. Press and hold 90 Hz-150 Hz PHASE DEVIATION Switch (16). Record centering error due to tone phase shift. Release 90 Hz-150 Hz PHASE DEVIATION Switch (16).

15. Rotate VARIABLE BEARING Control (26) ***ccw*** until ***348.00*** is on BEARING-FREQUENCY Display (2).

16. Press and hold 90 Hz-150 Hz PHASE DEVIATION Switch (16). Record centering error due to tone phase shift. Release 90 Hz-150 Hz PHASE DEVIATION Switch (16).

(c) G/S CDI Deflection AGC Characteristics and Deflection Balance Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set

CONTROL	SETTING
(6) RF OUTPUT ATTENUATOR	***-50***
(10) FREQUENCY SELECTOR Switches	***108.100***
(19) LOC-G/S FREQUENCY SELECT Switch	***G/S***

3. Verify CDI G/S pointer is centered.

4. Set G/S DDM SELECTOR Switch (14) to ***Left 0.091*** or ***Right 0.091***. Verify G/S pointer is deflected 52% of full scale deflection (Standard Deflection).

5. Rotate RF OUTPUT ATTENUATOR (6) until CDI G/S pointer deflection is 60% of Standard Deflection.

6. Refer to Appendix A to determine G/S RF sensitivity.

7. Repeat Steps 5 and 6 for each G/S channel (1-2-4, Table 1).

(d) G/S Warning Signal Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-50***
(10) FREQUENCY SELECTOR Switches	***108.100***
(19) LOC-G/S FREQUENCY SELECT Switch	***G/S***

3. Verify Alarm signal (Warning Flag) is out of sight or OFF and G/S pointer is centered.

NORMAL SIGNAL, FLUCTUATING RF

4. Rotate RF OUTPUT ATTENUATOR (6) from ***-67*** to ***-17***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

RF SIGNAL ABSENT

5. Set RF OUTPUT ATTENUATOR (6) to ***-112***. Disconnect cable from RF OUTPUT Connector (J3) (9). Verify Alarm Signal (Warning Flag) is visible.

MISSING 90 Hz OR 150 Hz TONES

6. Connect cable to RF OUTPUT Connector (J3) (9) and set RF OUTPUT ATTENUATOR (6) to ***-50***. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

7. Set LOC DDM SELECTOR Switch (23) to ***150 Hz***. Verify Alarm Signal (Warning Flag) is visible.

8. Set LOC DDM SELECTOR Switch (23) to ***90 Hz***. Verify Alarm Signal (Warning Flag) is visible.

MISSING 90 AND 150 Hz TONES

9. Set NAV-750B controls as follows:

CONTROL	SETTING
(14) G/S DDM SELECTOR Switch	***150***
(23) LOC DDM SELECTOR Switch	***90***

10. Verify Alarm Signal (Warning Flag) is visible.

STEP PROCEDURE

MARGINAL G/S SIGNAL STRENGTH

11. Set NAV-750B controls as follows:

CONTROL	SETTING
(6) RF OUTPUT ATTENUATOR	***-50***
(14) G/S DDM SELECTOR Switch	***0.091***
(23) LOC DDM SELECTOR Switch	***0***

12. Verify CDI pointer is at Standard Deflection (52% of full scale).

13. Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer is deflected 50% of Standard Deflection. Verify Alarm Signal (Warning Flag) is visible.

(e) CDI G/S Deviation Indication Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(3) BEARING-FREQUENCY DISPLAY Switch	***FREQ***
(6) RF OUTPUT ATTENUATOR	***-50***
(10) FREQUENCY SELECTOR Switches	***108.100***
(19) LOC-G/S FREQUENCY SELECT Switch	***G/S***

3. Verify CDI LOC pointer is centered.

CDI G/S DEFLECTION RESPONSE (0.175 DDM)

4. Set G/S DDM SELECTOR Switch (14) to ***Left 0.175***. Verify CDI pointer reaches 67% of full scale deflection within 0.6 seconds and then stops at full scale. Verify pointer overshoot remains <2% of full scale deflection.

5. Set G/S DDM SELECTOR Switch (14) to ***Right 0.175***. Verify CDI pointer reaches 67% of full scale deflection within 0.6 seconds and then stops at full scale. Verify pointer overshoot remains <2% of full scale deflection.

CDI G/S DEFLECTION (0.200 DDM)

6. Set G/S DDM SELECTOR Switch (14) to ***Right 0.400***. Verify pointer deflection remains at Up full scale.

7. Set G/S DDM SELECTOR Switch (14) to ***Left 0.400***. Verify pointer deflection remains at Down full scale.

CDI G/S REFLECTION (0.091 DDM)

8. Set G/S DDM SELECTOR Switch (14) to ***Left 0.091***. Verify pointer deflection is Down Left Standard.

9. Set G/S DDM SELECTOR Switch (14) to ***Right 0.091***. Verify pointer deflection is Up Right Standard.

CDI G/S DEFLECTION (0.045 DDM)

10. Set G/S DDM SELECTOR Switch (14) to ***Right 0.045***. Verify pointer deflection is Up Right Half Standard.

11. Set G/S DDM SELECTOR Switch (14) to ***Left 0.045***. Verify pointer deflection is Down Left Half Standard.

12. Set G/S DDM SELECTOR Switch (14) to ***0***. Verify pointer is centered.

(5) COMM Receiver Test Example

(a) General

The NAV-750B provides a 1020 Hz signal at 30% modulation on COMM frequencies. Channel spacing is 25, 50, 100 or 200 kHz. Any channel is selectable with FREQUENCY SELECTOR Switches (10). The EXTERNAL MODULATION INPUT Connector (J18) (58) allows signals other than 1020 Hz, automatically provided, to be applied to RF output. When other signals are used, 1020 Hz tone is eliminated by turning 1020 Hz IDENT AND MKR TONE MODULATION Control (34) fully ccw out of calibrated detent position. The modulation level of the external modulation input signal is adjusted with MASTER MODULATION LEVEL Control (41) from 0 to maximum modulation as indicated on METER (43) % modulation scale.

(b) COMM Receiver Channel Gain Test Example

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set RF OUTPUT ATTENUATOR (6) to -81.

COMM CHANNEL GAIN TEST

3. Set NAV-750B controls as follows:

CONTROL	SETTING
(7) CHANNELING RATE Control	***fully ccw***
(8) AUTO-MANUAL FREQUENCY CONTROL Switch	***AUTO***
(15) CHANNELING FREQUENCY INCREMENT Switch	***25***

4. Adjust CHANNELING RATE Control (7) for desired rate.

5. Verify each COMM channel output is not less than UUT Manufacturer's specified output.

COMM CHANNEL SENSITIVITY

6. Rotate RF OUTPUT ATTENUATOR (6) until (signal + noise)/noise is 6 dB. Verify RF level does not exceed 5 µV (-93 dBm) for each COMM channel.

AVC CHARACTERISTICS

7. Rotate RF OUTPUT ATTENUATOR (6) from 10 µV (-87 dBm) to 20,000 µV (-21 dBm). Verify audio output does not vary more than 10 dB at input levels of 10, 100, 1000, 3000, 10,000 and 20,000 µV for each COMM channel.

(6) MKR Receiver Test Example

(a) General

The NAV-750B is capable of testing MKR receivers operating on 75.000 MHz. The NAV-750B provides a tuning range from 70.000 to 79.900 MHz. Tones of 1020, 400, 1300 and 3000 Hz, modulated at 95%, are selectable with the METER FUNCTION AND TONE SELECTOR Switch (39). EXTERNAL MODULATION INPUT Connector (J18) (58) allows external modulation and MASTER MODULATION LEVEL Control (41) sets modulation level.

(b) MKR Receiver Selectivity Test

STEP	PROCEDURE

1. Set NAV-750B controls as shown in 1-2-4B.

2. Set NAV-750B controls as follows:

CONTROL	SETTING
(10 FREQUENCY SELECTOR Switches	***75.000***
(39) METER FUNCTION AND TONE SELECTOR Switch	***400***

3. Rotate ΔF Control (1) and determine frequencies where output is at least 40 dBc.

4. Rotate ΔF Control (1) and determine frequency span where output is down <6 dBc.

AGC CHARACTERISTICS

5. Rotate RF OUTPUT ATTENUATOR (6) from lamp threshold input power to 50,000 μV (-13 dBm). Verify Audio level is ≤10 dB.

THREE LAMP OPERATION

6. Set RF OUTPUT ATTENUATOR (6) to ***-112***.

7. Rotate RF OUTPUT ATTENUATOR (6) until Blue Marker Beacon Lamp (outer MKR) is illuminated.

8. Set NAV-750B controls as follows:

CONTROL	SETTING
(6) RF OUTPUT ATTENUATOR	***-112***
(39) METER FUNCTION AND TONE SELECTOR Switch	***1300***

9. Rotate RF OUTPUT ATTENUATOR (6) until Amber Marker Beacon Lamp (middle MKR) is illuminated.

STEP PROCEDURE

10. Set NAV-750B controls as follows:

CONTROL	SETTING
(6) RF OUTPUT ATTENUATOR	***-112***
(39) METER FUNCTION AND TONE SELECTOR Switch	***3000***

11. Rotate RF OUTPUT ATTENUATOR (6) until White Marker Beacon Lamp (inner MKR) is illuminated.

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SECTION 3 - SPECIFICATIONS

1. General

NOTE: Specifications and features are subject to change without notice.

A. RF Power Out:

Accuracy:	±1.5 dBm from -6 to -50 dBm ±2.5 dBm from -50 to -120 dBm
Leakage:	<3 µV at 334.700 MHz, 1 µV at 108.000 MHz induced in a two-turn, one inch diameter (#20 gauge wire) loop, measured one inch away from any surface and into a 50 Ω receiver.

B. Internal TCXO:

Accuracy:	<±1 ppm at 15° to 35° C <±3 ppm at 10° to 45° C (After calibration at 25° C)
Aging:	<±2 ppm/Year

C. Clock Oscillator (2.16 MHz):

Accuracy:	±0.02%

D. Modulation:

AM Depth:

VOR	0% to 98%
LOC	0% to 98%
COMM	0% to 98%
G/S	0% to 93%
MKR	0% to 98%

NOTE: 0-100 Meter scale is selected for G/S and MKR tones. All other tones are measured on 0-30% scale.

NOTE: All values are for single-tone modulation of indicated frequency. MKR tones maximum modulation depth capability is ≥60% from 70.000 to 74.000 MHz.

NOTE: All values are measured at RF OUTPUT Connector (J3).

MODULATION FREQUENCY	RF RANGE	ACCEPTABLE MODULATION LEVEL (ABSOLUTE)
30 Hz	VOR	30% (±1.2%)
9960 Hz	VOR	30% (±1.2%)
90 Hz	LOC	20% (±0.8%)
150 Hz	LOC	20% (±0.8%)
90 Hz	G/S	40% (±1.6%)
150 Hz	G/S	40% (±1.6%)
1020 Hz	COMM	30% (±1.2%)
400 Hz	MKR	95% (±2.85%)
1300 Hz	MKR	95% (±2.85%)
3000 Hz	MKR	95% (±2.85%)

E. Tones:

Distortion:

9960 Hz:	1.5% Maximum
30 Hz REF:	0.5% Maximum
30 Hz VAR:	0.5% Maximum
1020 Hz REF:	0.5% Maximum
90 Hz:	0.4% Maximum
150 Hz:	0.4% Maximum
400 Hz:	0.7% Maximum
1300 Hz:	0.7% Maximum
3000 Hz:	0.7% Maximum

Frequencies:

90 Hz:	±0.2%
150 Hz:	±0.2%
30 Hz REF:	±0.2%
30 Hz VAR:	±0.2%
9960 Hz:	Phase-locked to 30 Hz REF tone
1020 Hz:	±0.5%
400 Hz:	±0.7%
1300 Hz:	±0.7%
3000 Hz:	±0.7%

NOTE: The 90 Hz, 150 Hz, 30 Hz REF and 30 Hz VAR tones are derived from 2.16 MHz crystal oscillator and tones reflect oscillator accuracy.

NOTE: Tone distortion should increase no more than 0.2% at RF DEMOD OUTPUT Connector (J23).

F. DDM Accuracy:

NOTE: Composite Audio Error is 0.001 DDM + 0.02% DDM setting.

NOTE: Composite Modulation Error is 0.001 DDM + 4% DDM setting.

DDM SETTING	COMPOSITE AUDIO ERROR (DDM)	COMPOSITE MODULATION ERROR (DDM)
(LOC) .046	.00101	.00283
(LOC) .093	.00102	.00370
(LOC) .155	.00103	.00720
(LOC) .200	.00104	.00900
(G/S) .045	.00101	.00280
(G/S) .091	.00102	.00464
(G/S) .175	.00104	.00800
(G/S) .400	.00104	.01700

G. VOR Section:

Bearing Selection: Twelve preset bearings - 30° each. Additional +10° and -10° steps from any bearing selected. Variable Bearing Control provides continuous bearing adjustment in 0.01° or 0.05° steps.

Bearing Accuracy: ±0.05° on all bearings.

Bearing Monitor: By independent counter. Displays bearing to 0.01° resolution.

VOR Tones: 30 Hz REF and 30 Hz VAR tones are derived from 2.16 MHz crystal oscillator. 9960 Hz tone is frequency locked to 2.16 MHz crystal oscillator.

IDENT Tone: 1020 Hz tone may be added from 0% to 60% modulation.

H. LOC Section:

Deviation: ±0.046 DDM, ±0.093 DDM, ±0.155 DDM, ±0.200 DDM and continuously adjustable ±0.4 DDM. One tone may be deleted while other is at 20%.

Centering Accuracy: ±0.001 DDM (±0.85 µA)

Tones:	90 Hz and 150 Hz tones are phase-locked to ±0.1° or phase variable at five times angle selected by VOR bearing selector. 1020 Hz tone may be added.

I. G/S Section:

Deviation:	±0.045 DDM, ±0.091 DDM, ±0.175 DDM, ±0.400 DDM and continuously adjustable ±0.8 DDM. One tone may be deleted while other is at 40%.
Centering Accuracy:	±0.001 DDM (±1.0 µA)
Tones:	90 Hz and 150 Hz tones are phase-locked to ±0.1° or phase variable at five times angle selected by VOR bearing selector. 1020 Hz tone may be added.

J. COMM Section:

Modulation:	1020, 400, 1300 and 3000 Hz tones at 0% to 60% AM for audio tests. External modulation may be added.

K. MKR Section:

Tones:	1020, 400, 1300 and 3000 Hz.
Modulation:	Selectable at 95% (±3%) modulation in CAL. Variable 0% to 98% in UNCAL.

L. RF Generator:

Frequency Range:	70.000 to 79.900 MHz 108.000 to 156.000 MHz 329.000 to 335.000 MHz (25 kHz increments)
Frequency Selection:	Manually by thumbwheel switch. Automatically up at a variable rate in 25, 50, 100 or 200 kHz increments. Auto channeling stops at 117.950 and 137.975 MHz. External channeling may be added.
Variable Frequency:	±50 kHz minimum at 108.000 to 156.000 MHz and ±150 kHz minimum from 329.000 to 335.000 MHz. Generator remains phase-locked at all fixed and variable frequencies.
Frequency Accuracy:	Controlled by oven crystal to 0.0001%.

Frequency Monitor:	By independent counter to 1 or 0.1 kHz resolution. Counter time base of ±0.0001%.
Remote Function:	Frequency in use fed to NAV-750B as 2-out-of-5 channeling and parallel BCD. Remote channeling follows manual or auto selection.
Modulation Selection:	Automatic by frequency selected. VOR modulation applied if on any VOR frequency. LOC modulation applied if on any LOC frequency. G/S modulation applied if on any G/S frequency. Tone frequency selectable for MKR operation.

M. External Modulation:

NOTE: External modulation may be added to any signal through EXTERNAL MODULATION INPUT Connector (J18). When not in use, EXTERNAL MODULATION INPUT Connector (J18) must be terminated with 100 Ω or less.

Impedance (J18):	1 kΩ Nominal
Sensitivity:	9.1 Vp-p (±0.6 V) = 90% (Master Modulation Level Control set to CAL.)

N. DEMOD Output:

Impedance (J23):	Minimum resistance is 1 kΩ.
dc Voltage:	3.75 V (±0.3 V)
ac Voltage:	2.72 V (±0.2 V) = 100% Modulation

O. General Characteristics:

Power Requirements:	105 to 120 VAC or 220 to 250 VAC, 50 to 400 Hz. Cooling fan is 50/60 Hz only. Optional DC Cooling Fan available for 400 Hz operation.
Power Consumption:	250 W Maximum, 110 W Nominal

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SECTION 4 - SHIPPING

1. General

The following information applies to shipping and repacking procedures for the Test Set.

A. Shipping Information

IFR Test Sets returned to factory for calibration, service or repair must be repackaged and shipped subject to the following conditions:

(1) Authorization

Do not return any products to factory without authorization from IFR Customer Service Department.

CONTACT: IFR Systems, Inc.
Customer Service Dept.
10200 West York Street
Wichita, Kansas 67215

Telephone: 800-835-2350
TWX: 910-741-6952

(2) Tagging Test Sets

All Test Sets must be tagged with:

- Owner's identification and address.
- Nature of service or repair required.
- Model No.
- Serial No.

(3) Shipping Containers

Test Sets must be repackaged in original shipping containers using IFR packing molds. If original shipping containers and materials are not available, contact IFR Customer Service Dept. for shipping instructions.

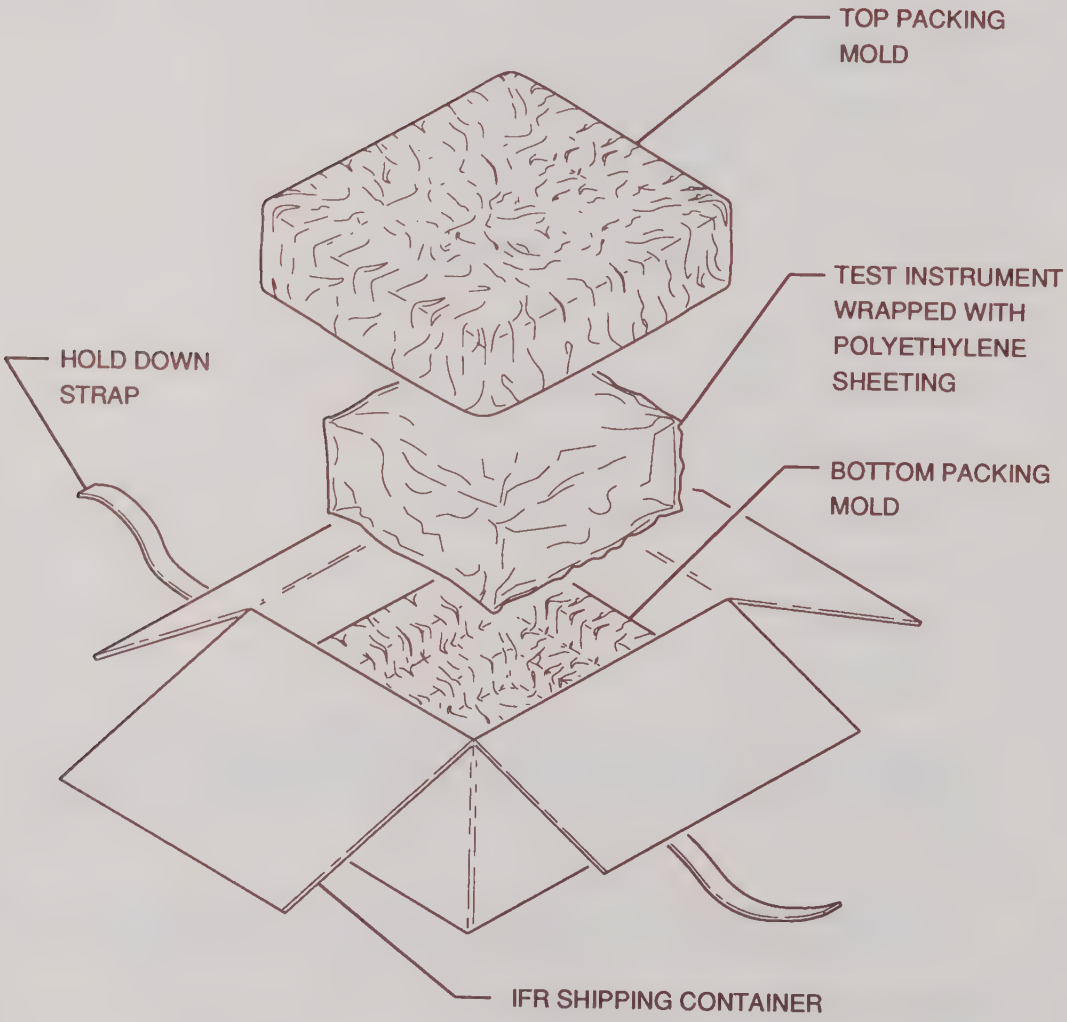
(4) Freight Costs

All freight costs on non-warranty shipments are assumed by customer. (See "Warranty Packet" for freight charge policy on warranty claims.)

B. Repacking Procedure (1-4-1, Figure 1)

- Make sure bottom packing mold is seated on floor of shipping container.
- Carefully wrap Test Set with polyethylene sheeting to protect finish.

- Place Test Set into shipping container, making sure Test Set is securely seated in bottom packing mold.
- Place top packing mold over top of Test Set and press down until mold rests solidly on bottom packing mold.
- Close shipping container lids and seal with shipping tape or an industrial stapler. Tie all sides of container with break resistant rope, twine or equivalent.



Repacking Procedure
Figure 1

SECTION 5 - STORAGE

1. General

The following storage precautions should be accomplished whenever the Test Set is stored for extended periods:

- Disconnect Test Set from electrical power source.
- Disconnect and store ac power cable and accessories with Test Set.
- Cover Test Set to prevent dust and debris from covering and entering Test Set.

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APPENDIX A - CORRESPONDENCE CHART FOR DECIBELS, VOLTS AND WATTS

DECIBELS	VOLTS	WATTS
+40 dBw	709 V	10.00 kW
+39 dBw	633 V	7.94 kW
+38 dBw	563 V	6.32 kW
+37 dBw	501 V	5.00 kW
+36 dBw	447 V	3.98 kW
+35 dBw	399 V	3.16 kW
+34 dBw	355 V	2.51 kW
+33 dBw	317 V	2.00 kW
+32 dBw	282 V	1.59 kW
+31 dBw	252 V	1.26 kW
+30 dBw	224 V	1.00 kW
+29 dBw	200 V	794 W
+28 dBw	178 V	632 W
+27 dBw	159 V	500 W
+26 dBw	141 V	398 W
+25 dBw	126 V	316 W
+24 dBw	112 V	251 W
+23 dBw	100 V	200 W
+22 dBw	89.1 V	159 W
+21 dBw	79.5 V	126 W
+20 dBw	70.9 V	100 W
+19 dBw	63.3 V	79.4 W
+18 dBw	56.3 V	63.2 W
+17 dBw	50.1 V	50.0 W
+16 dBw	44.7 V	39.8 W
+15 dBw	39.9 V	31.6 W
+14 dBw	35.5 V	25.1 W
+13 dBw	31.7 V	20.0 W
+12 dBw	28.2 V	15.9 W
+11 dBw	25.2 V	12.6 W
+10 dBw	22.4 V	10.0 W
+9 dBw	20.0 V	7.94 W
+8 dBw	17.8 V	6.32 W
+7 dBw	15.9 V	5.00 W
+6 dBw	14.1 V	3.98 W
+5 dBw	12.6 V	3.16 W
+4 dBw	11.2 V	2.51 W
+3 dBw	10.0 V	2.00 W
+2 dBw	8.91 V	1.59 W
+1 dBw	7.95 V	1.26 W

DECIBELS	VOLTS	WATTS
+30 dBm	7.09 V	1.00 W
+29 dBm	6.33 V	794 mW
+28 dBm	5.63 V	632 mW
+27 dBm	5.01 V	500 mW
+26 dBm	4.47 V	398 mW
+25 dBm	3.99 V	316 mW
+24 dBm	3.55 V	251 mW
+23 dBm	3.17 V	200 mW
+22 dBm	2.82 V	159 mW
+21 dBm	2.52 V	126 mW
+20 dBm	2.24 V	100 mW
+19 dBm	2.00 V	79.4 mW
+18 dBm	1.78 V	63.2 mW
+17 dBm	1.59 V	50.0 mW
+16 dBm	1.41 V	39.8 mW
+15 dBm	1.26 V	31.6 mW
+14 dBm	1.12 V	25.1 mW
+13 dBm	1.00 V	20.0 mW
+12 dBm	891 mV	15.9 mW
+11 dBm	795 mV	12.6 mW
+10 dBm	709 mV	10.0 mW
+9 dBm	633 mV	7.94 mW
+8 dBm	563 mV	6.32 mW
+7 dBm	501 mV	5.00 mW
+6 dBm	447 mV	3.98 mW
+5 dBm	399 mV	3.16 mW
+4 dBm	355 mV	2.51 mW
+3 dBm	317 mV	2.00 mW
+2 dBm	282 mV	1.59 mW
+1 dBm	252 mV	1.26 mW
+0 dBm	224 mV	1.00 mW
-1 dBm	200 mV	794 µW
-2 dBm	178 mV	632 µW
-3 dBm	159 mV	500 µW
-4 dBm	141 mV	398 µW
-5 dBm	126 mV	316 µW
-6 dBm	112 mV	251 µW
-7 dBm	100 mV	200 µW
-8 dBm	89 mV	159 µW
-9 dBm	79 mV	126 µW
-10 dBm	70.9 mV	100 µW
-11 dBm	63.3 mV	79.4 µW
-12 dBm	56.3 mV	63.2 µW
-13 dBm	50.1 mV	50.0 µW
-14 dBm	44.7 mV	39.8 µW

DECIBELS	VOLTS	WATTS
-15 dBm	39.9 mV	31.6 µW
-16 dBm	35.5 mV	25.1 µW
-17 dBm	31.7 mV	20.0 µW
-18 dBm	28.2 mV	15.9 µW
-19 dBm	25.2 mV	12.6 µW
-20 dBm	22.4 mV	10.0 µW
-21 dBm	20.0 mV	7.94 µW
-22 dBm	17.8 mV	6.32 µW
-23 dBm	15.9 mV	5.00 µW
-24 dBm	14.1 mV	3.98 µW
-25 dBm	12.6 mV	3.16 µW
-26 dBm	11.2 mV	2.51 µW
-27 dBm	10.0 mV	2.00 µW
-28 dBm	8.9 mV	1.59 µW
-29 dBm	7.95 mV	1.26 µW
-30 dBm	7.09 mV	1.00 µW
-31 dBm	6.33 mV	794 nW
-32 dBm	5.63 mV	632 nW
-33 dBm	5.01 mV	500 nW
-34 dBm	4.47 mV	398 nW
-35 dBm	3.99 mV	316 nW
-36 dBm	3.55 mV	251 nW
-37 dBm	3.17 mV	200 nW
-38 dBm	2.82 mV	159 nW
-39 dBm	2.52 mV	126 nW
-40 dBm	2.24 mV	100 nW
-41 dBm	2.00 mV	79.4 nW
-42 dBm	1.78 mV	63.2 nW
-43 dBm	1.59 mV	50.0 nW
-44 dBm	1.41 mV	39.8 nW
-45 dBm	1.26 mV	31.6 nW
-46 dBm	1.12 mV	25.1 nW
-47 dBm	1.00 mV	20.0 nW
-48 dBm	891 µV	15.9 nW
-49 dBm	795 µV	12.6 nW
-50 dBm	709 µV	10.0 nW
-51 dBm	633 µV	7.94 nW
-52 dBm	563 µV	6.32 nW
-53 dBm	501 µV	5.00 nW
-54 dBm	447 µV	3.98 nW
-55 dBm	399 µV	3.16 nW
-56 dBm	355 µV	2.51 nW
-57 dBm	317 µV	2.00 nW
-58 dBm	282 µV	1.59 nW
-59 dBm	252 µV	1.26 nW

DECIBELS	VOLTS	WATTS
-60 dBm	224 µV	1.00 nW
-61 dBm	200 µV	794 pW
-62 dBm	178 µV	632 pW
-63 dBm	159 µV	500 pW
-64 dBm	141 µV	398 pW
-65 dBm	126 µV	316 pW
-66 dBm	112 µV	251 pW
-67 dBm	100 µV	200 pW
-68 dBm	89.1 µV	159 pW
-69 dBm	79.5 µV	126 pW
-70 dBm	70.9 µV	100 pW
-71 dBm	63.3 µV	79.4 pW
-72 dBm	56.3 µV	63.2 pW
-73 dBm	50.1 µV	50.0 pW
-74 dBm	44.7 µV	39.8 pW
-75 dBm	39.9 µV	31.6 pW
-76 dBm	35.5 µV	25.1 pW
-77 dBm	31.7 µV	20.0 pW
-78 dBm	28.2 µV	15.9 pW
-79 dBm	25.2 µV	12.6 pW
-80 dBm	22.4 µV	10.0 pW
-81 dBm	20.0 µV	7.94 pW
-82 dBm	17.8 µV	6.32 pW
-83 dBm	15.9 µV	5.00 pW
-84 dBm	14.1 µV	3.98 pW
-85 dBm	12.6 µV	3.16 pW
-86 dBm	11.2 µV	2.51 pW
-87 dBm	10.0 µV	2.00 pW
-88 dBm	8.91 µV	1.59 pW
-89 dBm	7.95 µV	1.26 pW
-90 dBm	7.09 µV	1.00 pW
-91 dBm	6.33 µV	794 fW
-92 dBm	5.63 µV	632 fW
-93 dBm	5.01 µV	500 fW
-94 dBm	4.47 µV	398 fW
-95 dBm	3.99 µV	316 fW
-96 dBm	3.55 µV	251 fW
-97 dBm	3.17 µV	200 fW
-98 dBm	2.82 µV	159 fW
-99 dBm	2.52 µV	126 fW
-100 dBm	2.24 µV	100 fW
-101 dBm	2.00 µV	79.4 fW
-102 dBm	1.78 µV	63.2 fW
-103 dBm	1.59 µV	50.0 fW
-104 dBm	1.41 µV	39.8 fW

DECIBELS	VOLTS	WATTS
-105 dBm	1.26 μV	31.6 fW
-106 dBm	1.12 mV	25.1 fW
-107 dBm	1.00 mV	20.0 fW
-108 dBm	891 nV	15.9 fW
-109 dBm	795 nV	12.6 fW
-110 dBm	709 nV	10.0 fW
-111 dBm	633 nV	7.94 fW
-112 dBm	563 nV	6.32 fW
-113 dBm	501 nV	5.00 fW
-114 dBm	447 nV	3.98 fW
-115 dBm	399 nV	3.16 fW
-116 dBm	355 nV	2.51 fW
-117 dBm	317 nV	2.00 fW
-118 dBm	282 nV	1.59 fW
-119 dBm	252 nV	1.26 fW
-120 dBm	224 nV	1.00 fW
-121 dBm	200 nV	794 aW
-122 dBm	178 nV	632 aW
-123 dBm	159 nV	500 aW
-124 dBm	141 nV	398 aW
-125 dBm	126 nV	316 aW
-126 dBm	112 nV	251 aW
-127 dBm	100 nV	200 aW
-128 dBm	89.1 nV	150 aW
-129 dBm	79.5 nV	126 aW
-130 dBm	70.9 nV	100 aW
-131 dBm	63.3 nV	79.4 aW
-132 dBm	56.3 nV	63.2 aW
-133 dBm	50.1 nV	50.0 aW
-134 dBm	44.7 nV	39.8 aW
-135 dBm	39.9 nV	31.6 aW
-136 dBm	35.5 nV	25.1 aW
-137 dBm	31.7 nV	20.0 aW
-138 dBm	28.2 nV	15.9 aW
-139 dBm	25.2 nV	12.6 aW

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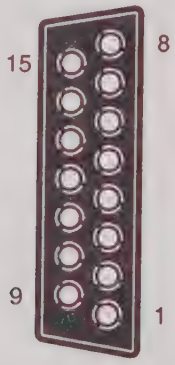
APPENDIX B - CONNECTOR PIN OUT TABLES

1. Table of User I/O Connectors

CONNECTOR		TYPE	INPUT/OUTPUT
J3	RF OUTPUT	RF SUB	OUTPUT
J8	REMOTE CHANNELING	D-TYPE	OUTPUT
J10	ACCESSORY	D-TYPE	INPUT/OUTPUT
J16	1020 Hz IDENT TONE	BNC	OUTPUT
J17	90 Hz TONE	BNC	OUTPUT
J18	EXTERNAL MODULATION	BNC	INPUT
J19	150 Hz TONE	BNC	OUTPUT
J20	9960 Hz TONE	BNC	OUTPUT
J21	SUM-OF-TONES	BNC	OUTPUT
J22	30 Hz REFERENCE TONE	BNC	OUTPUT
J23	RF DEMOD	BNC	OUTPUT
J24	30 Hz VARIABLE TONE	BNC	OUTPUT
P15	AC INPUT	AC POWER	INPUT

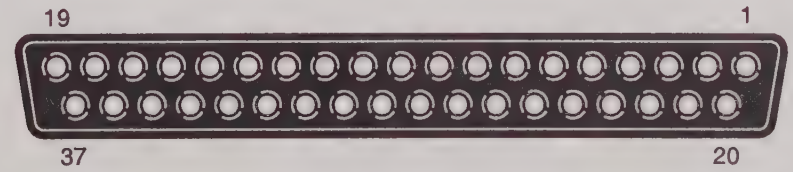
2. Pin Out Table for ACCESSORY Connector (J10)

PIN NO.	SIGNAL TYPE	INPUT/OUTPUT
1	+24 V	OUTPUT
2	+12 V	OUTPUT
3	+5 V	OUTPUT
4	GND	
5	-12 V	OUTPUT
6	REMOTE CHANNELING	INPUT
7	GND	
8	EXTERNAL CLOCK SELECT GND	
9	EXTERNAL BEARING CLOCK	INPUT
10	1020 Hz TONE	OUTPUT
11	EXTERNAL MODULATION	INPUT
12	END OF CHANNELING	INPUT
13	N/C	
14	N/C	
15	N/C	



3. Pin Out Table for REMOTE CHANNELING OUTPUT Connector (J8)

PIN NO.	ASSIGNMENT	INPUT/OUTPUT
1	1 MHz	OUTPUT
2	1 MHz	OUTPUT
3	1 MHz	OUTPUT
4	10 MHz	OUTPUT
5	10 MHz	OUTPUT
6	10 MHz	OUTPUT
7	LOC	OUTPUT
8	10 MHz	OUTPUT
9	10 MHz	OUTPUT
10	0.01 MHz	OUTPUT
11	COMM	OUTPUT
12	0.01 MHz	OUTPUT
13	0.01 MHz	OUTPUT
14	0.01 MHz	OUTPUT
15	BCD GND REAR	OUTPUT
16	0.05 MHz	OUTPUT
17	0.1 MHz	OUTPUT
18	N/C	OUTPUT
19	0.2 MHz	OUTPUT
20	0.01 MHz	OUTPUT
21	0.1 MHz	OUTPUT
22	0.1 MHz	OUTPUT
23	0.1 MHz	OUTPUT
24	0.1 MHz	OUTPUT
25	0.1 MHz	OUTPUT
26	1 MHz	OUTPUT
27	1 MHz	OUTPUT
28	10 MHz	OUTPUT
29	20 MHz	OUTPUT
30	40 MHz	OUTPUT
31	8 MHz	OUTPUT
32	1 MHz	OUTPUT
33	0.8 MHz	OUTPUT
34	0.025 MHz	OUTPUT
35	2 MHz	OUTPUT
36	4 MHz	OUTPUT
37	0.4 MHz	OUTPUT



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APPENDIX C - METRIC/BRITISH IMPERIAL CONVERSION TABLE WITH NAUTICAL DISTANCE CONVERSIONS

To Convert:	Into:	Multiply By:	To Convert:	Into:	Multiply By:
cm	feet	0.03281	meters	feet	3.281
cm	inches	0.3937	meters	inches	39.37
feet	cm	30.48	m/sec	ft/sec	3.281
feet	meters	0.3048	m/sec	km/hr	3.6
ft/sec	km	1.097	m/sec	miles/hr	2.237
ft/sec	knots	0.5921	miles	feet	5280
ft/sec	miles/hr	0.6818	miles	km	1.609
ft/sec^2	cm/sec^2	30.48	miles	meters	1609
ft/sec^2	m/sec^2	0.3048	miles	nmi	0.8684
grams	ounces	0.03527	miles/hr	ft/sec	1.467
inches	cm	2.54	miles/hr	km/hr	1.609
kg	pounds	2.205	miles/hr	knots	0.8684
kg/cm^2	psi	0.0703	nmi	feet	6080.27
km	feet	3281	nmi	km	1.8532
km	miles	0.6214	nmi	meters	1853.2
km	nmi	0.5396	nmi	miles	1.1516
km/hr	ft/sec	0.9113	ounces	grams	28.34953
km/hr	knots	0.5396	pounds	kg	0.4536
km/hr	miles/hr	0.6214	psi	kg/cm^2	0.0703
knots	ft/sec	1.689	100 ft	km	3.048
knots	km/hr	1.8532	100 ft	miles	1.894
knots	miles/hr	1.1516	100 ft	nmi	1.645

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APPENDIX D - ABBREVIATIONS

A	
A	Ampere
ac	Alternating Current
AM	Amplitude Modulation
AUTO	Automatic
aW	Attowatts
B	
BCD	Binary Coded Decimel
BRG	Bearing
C	
C	Celsius
CAL	Calibrated
ccw	Counterclockwise
CDI	Course Deviation Indicator
cm	Centimeter
COMM	Communication
cw	Clockwise
D	
dB	Decibel
dBc	Decibel Below Carrier
dBm	Decibels Relative to Milliwatts
dc	Direct Current
DDM	Difference in Depth of Modulation
DEMOD	Demodulated
F	
FM	Frequency Modulation
FREQ	Frequency
ft	Feet
fW	Femtowatts
G	
GHz	Gigahertz
GND	Ground
G/S	Glideslope
H	
Hz	Hertz
I	
IDENT	Identification
ILS	Instrument Landing System
K	
kg	Kilogram
kHz	Kilohertz
kW	Kilowatt
L	
LOC	Localizer
M	
MAX	Maximum
MHz	Megahertz
MIN	Minimum
MKR	Marker Beacon
MOD	Modulation
mV	Millivolt
mW	Milliwatt
N	
NAV	Navigation
nV	Nanovolt
nW	Nanowatt
P	
psi	Pounds per Square Inch
pW	Picowatt
R	
REF	Reference
RF	Radio Frequency
S	
sec	Second

T

TCXO	Temperature Controlled Crystal Oscillator

U

UNCAL	Uncalibrated
UUT	Unit Under Test

V

V	Volt
VAC	Volts Alternating Current
VAR	Variable
Vdc	Volts Direct Current
VOR	Very High Frequency Omnidirectional and Radio Range
Vp-p	Volts Peak-Peak

W

W	Watt

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